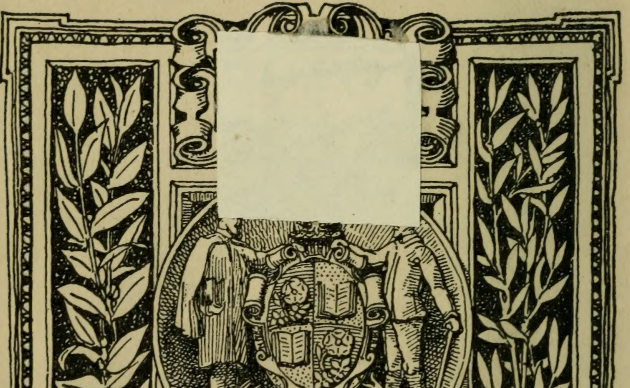

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KEY AND FLORA

PACIFIC COAST EDITION

PREPARED BY

ALICE EASTWOOD

OF THE CALIFORNIA ACADEMY OF SCIENCES, AUTHOR OF THE
FLORA IN THE ROCKY MOUNTAIN EDITION

BOSTON, U.S.A.
GINN & COMPANY, PUBLISHERS
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PREFACE

This Flora of the Pacific States has been made to enable pupils to obtain a clear idea of the method of classifying plants through practical experience in identifying the most common genera and species of the coast. It is to serve as a guide in understanding the characteristics and relationships of large and important orders and genera, and, to some extent, in identifying species.

The species included have been those most widely distributed or those most abundant near large centers of population, so that sufficient material might easily be obtained for class study. Species not clearly and easily defined have been omitted even when abundant, so as to render the possibility of error as little as possible. Where a difference of opinion exists among botanists in regard to generic names, both have generally been given, one in parentheses.

Teachers will find, in whatever part of the Pacific States they may be, that they can collect a sufficient number of the plants here included to afford their pupils all the drill necessary. It is advised that the teachers furnish the plants for class study, being careful to select only from those here included rather than to allow the pupils themselves to select at random from the flora of the neighborhood; otherwise, the pupil is likely to become discouraged by failure in identifying plants not described in the book.

Teachers who are in doubt about any plants are earnestly requested to send specimens to the Academy of Sciences, San Francisco, where they will be compared with herbarium specimens and identified. The specimens should have both flower and fruit when possible, and in the case of herbs the entire plant should be sent, root and all.

It requires quite a library of botanical books to identify Pacific Coast species, since there is no book published that contains even all the known species, and there are many species still undiscovered. It is neither possible nor desirable to attempt to include all in a school flora. The chief books needed for a more complete study are the two large and expensive volumes of the State Geological Survey; the following botanical works of Prof. E. L. Greene: *Pittonia*, *Flora Franciscana*, and *The Botany of the Bay Region ; Western Cone-bearers*, by J. G. Lemmon; and, for *Compositæ* and *Gamopetalæ*, Gray's *Synoptical Flora.*

The plan of arrangement in preparing this Flora has been that of Professor Bergen's *Key and Flora to the Spring-blooming Plants of the Northern and Middle States*, which replaces this in the Eastern edition of his book. It seemed that a plan which he had tried and found successful was better to adopt than one that was new and untried. Whenever possible, his descriptions have been used, the aim throughout having been to follow as he led.

The botany of the Geological Survey, Professor Greene's botanical works, and Dr. Behr's *Botany of the Vicinity of San Francisco* have all been used in compiling the descriptions and making the Key.

The figures referred to are to be found in the text of this Key, unless the reference is preceded by *f.* or *e.* The former refers to Bergen's *Foundations of Botany*, the latter to his *Elements of Botany*.

The pronunciation is indicated by accent marks and the division of the accented syllable. A vowel ending this syllable has a long sound; but when the accented syllable ends in a consonant, the vowel has a short sound. It matters little whether the English or Continental sounds for the vowels are used; the former are more generally authorized, though the latter are becoming more and more prevalent.

In this revised edition I am indebted to Prof. C. V. Piper, of the Agricultural College, at Pullman, Washington, for additions to the Flora from Washington and Oregon, and to Mr. Louis A. Greata, of Los Angeles, for additions from the country adjacent to Los Angeles.

ALICE EASTWOOD

ACADEMY OF SCIENCES
SAN FRANCISCO

KEY TO SOME FAMILIES OF PHANEROGAMS

GYMNOSPERMS. Ovules not enclosed in an ovary.

Trees or shrubs, usually with needle-shaped or scale-like evergreen leaves and monœcious or diœcious flowers in catkins, the pistillate ones usually ripening into cones . . . . (Coniferæ), Pine Family, p. 13

ANGIOSPERMS. Ovules in an ovary.

MONOCOTYLEDONS. Flowers generally on plan of 3, never of 5; leaves usually parallel-veined.

GLUMACEOUS DIVISION. Flowers rudimentary, enclosed in husk-like bracts.

Bracts for each flower 2; stems jointed, hollow, cylindrical or nearly so . . . . (Gramineæ), Grass Family, p. 21

Bracts for each flower 1; stems not jointed, solid, triangular (Cyperaceæ), Sedge Family, p. 22

PETALOIDEOUS DIVISION. Flowers having a true perianth; not on a spadix.

Ovary free from the perianth, Stamens 6 (Liliaceæ), Lily Family, p. 23

Ovary adnate to the perianth.

Stamens 6 . (Amaryllidaceæ), Century Plant Family, p. 36
Stamens 3 . . . . (Iridaceæ), Iris Family, p. 37
Stamens 1 or (rarely) 2 . . (Orchidaceæ), Orchis Family, p. 39

DICOTYLEDONS. Flowers generally on the plan of 4 or 5. In woody plants the woody fiber forms concentric rings.

DIVISION I. APETALÆ. With but one set of floral envelopes or none.

Flowers in catkins. Trees or shrubs.

Diœcious, 1 flower to each scale of the catkin; fruit a many-seeded pod, each seed furnished with a tuft of cotton (Salicaceæ), Willow Family, p. 40

Monœcious; sterile catkins drooping; fertile, erect, cone-like, with 1 or 2 flowers under each stiff, shield-shaped scale (Betulaceæ), Alder Family, p. 42

Monœcious, androgynous; catkins short, erect, with 1 flower under each scale of the fertile catkin; fruit a round nutlet
(Myricaceæ), Wax-myrtle Family, p. 40

Monœcious, sterile flowers only in catkins; fruit a nut in a cup or bur, or a leaf-like cylindrical sheath
(Cupuliferæ), Oak Family, p. 44

Diœcious, sterile flowers with calyx 4-parted, stamens 4; fertile flowers with calyx 2-lobed or wanting, ovary 1-celled, 2-ovuled, styles 2; fruit a berry (Garryaceæ), Silk-tassel Bush Family, p. 120

Flowers not in catkins.

Ovary inferior,

6-celled, perianth regular and 3-lobed or irregular, stamens 6–12
(Aristolochiaceæ), Dutchman's Pipe Family, p. 46

1-celled, sunk in the axis of the conical spike, which has numerous flowers, and a persistent petal-like involucre; flowers naked, of 6–8 stamens and 3–6 pistils, each subtended by a white bract. Aromatic herbs of wet alkaline places
(Houttuynia), Yerba Mansa, p. 40

Ovary superior,

3-celled, 3-ovuled, stigmas 3–6. Monœcious or diœcious. Staminate flowers with 1 to many stamens. Plants with milky juice
(Euphorbiaceæ), Spurge Family, p. 99

1-celled, forming a 3-sided akene, stamens 9, perianth of 6 divisions usually colored like a corolla
(Polygonaceæ), Buckwheat Family, p. 47

1-celled, forming a flat akene with embryo coiled, stamens 5 opposite the divisions of the green perianth; plants often fleshy and covered with scurf . . (Chenopodiaceæ), Pigweed Family, p. 49

Similar to *Chenopodiaceæ*, but the divisions of the perianth are papery and persistent with similar bracts
(Amarantaceæ), Amaranth Family, p. 51

1-celled, 1-seeded, calyx corolla-like, monosepalous, the persistent herbaceous base hardening around the akene, style 1; flowers in calyx-like involucres
(Nyctaginaceæ), Four-o'clock Family, p. 51

Stamens 9 in 3 rows, anthers 4-celled, opening by uplifted valves; sepals 6, petaloid, pistil simple; flowers in umbels; trees with aromatic foliage . . . (Lauraceæ), Laurel Family, p. 63

DIVISION II. POLYPETALÆ. Petals distinct (in some genera wanting).

Stamens hypogynous (on the receptacle below the superior ovary).

Stamens Numerous

Separate, and the other floral organs distinct, petals sometimes wanting, flowers with the sepals 5 or irregular
(Ranunculaceæ), Buttercup Family, p. 58

Separate, flowers regular, sepals (generally 2) half as many as the petals and falling as the petals expand
(Papaveraceæ), Poppy Family, p. 64

Monadelphous, attached to the bases of the petals.

Anthers 1-celled, kidney-shaped
(Malvaceæ), Mallow Family, p. 105

Anthers 2-celled, petals wanting, sepals petal-like
(Fremontia), p. 107

United into 3–5 bunches, sepals and petals 5, leaves opposite, punctate
(Hypericaceæ), St. John's-wort Family, p. 107

About 20, sepals 5 (2 scale-like), petals 5, soon falling
(Cistaceæ), Rockrose Family, p. 108

Stamens 10 or less

10 (rarely fewer), petals 5 (sometimes wanting), capsule splitting into twice as many valves as styles. Seeds on axillary placenta
(Caryophyllaceæ), Pink Family, p. 55

10 or 5, sepals and petals 5, carpels 5 on a spike-like axis, distinct at base but cohering by their stigmas and separating from the axis at the base first, 1-seeded . . . . . . (Geraniaceæ), p. 95

10, sepals and petals 5, carpels distinct, 1-seeded, globose, at the base of a common style ; juice pungent . . . (Limnanthes), p. 97

10, sepals and petals 5, carpels united into a 5-celled ovary with 5 styles ; leaves compound with 3 leaflets ; juice acid . . (Oxalis), p. 97

10 or 5, equal to or double the number of petals ; herbs with fleshy leaves . . . . (Crassulaceæ), Stonecrop Family, p. 74

6 or 9, anthers 2-celled, opening by uplifted valves (*f*. Fig. 160, II ; *e*. Fig. 138, II) ; bracts, sepals, petals, and stamens opposite each other ; pistil simple (Berberidaceæ), Barberry Family, p. 62

6 (4 long and 2 short), petals and sepals 4 (petals sometimes wanting) ; fruit 2-celled with a papery partition, or sometimes 1-celled and indehiscent ; herbs with pungent juice
(Cruciferæ), Mustard Family, p. 67

6, or sometimes more, nearly equal, sepals and petals 4 ; pod 1-celled, on a long slender stalk (Capparidaceæ), Caper Family, p. 73

6, united by the filaments to form 2 equal sets ; flowers irregular (Fumariaceæ), Bleeding Heart Family, p. 66

5, sometimes united over the pistil ; petals 5, one of them with a spur (Violaceæ), Violet Family, p. 109

1 to many, sepals 2–8, petals 5–16, styles 3–8-cleft, ovary 1-celled with placenta axillary ; plants with fleshy leaves and mostly showy flowers that open only in bright sunshine (Portulacaceæ), Portulaca Family, p. 52

Stamens 4–7, petals 4–5 with long claws, ovary 1-celled, with as many parietal placentæ as divisions of the style (Frankeniaceæ), Yerba Reuma Family, p. 108

6–8, the filaments united into a split sheath ; flowers irregular, superficially resembling the *Papilionaceæ*, sepals 5, petals 2 ; pod 2-celled, flattened contrary to the partition (Polygalaceæ), Polygala Family, p. 98

5, monadelphous at base, petals soon falling, capsule splitting into twice as many divisions as stigmas (Linaceæ), Flax Family, p. 98

2 (rarely 3 or 4), petals 4, 2, or wanting, calyx 4-toothed ; fruit winged from the summit, 1-seeded ; polygamous or diœcious trees or shrubs with opposite compound leaves . . (Fraxinus), Ash, p. 128

Ovary superior or nearly so.

Stamens distinctly on the calyx or on a disk simulating a calyx tube

Numerous ; ovary simple or compound, free from or partly united to the disk ; leaves alternate, with stipules that sometimes fall early ; seeds without endosperm (Rosaceæ), Rose Family, p. 80

Stamens indefinite, petals merging into the sepals, carpels numerous, becoming akenes within a hollow disk ; aromatic shrubs, having opposite leaves and no stipules (Calycanthaceæ), Sweet Shrub Family, p. 80

Variable in number (5, 10, 20), carpels 2–5, completely or partially united to the calyx, styles distinct ; leaves without stipules ; seed with endosperm (Saxifragaceæ), Saxifrage Family, p. 75

10, distinct, monadelphous or diadelphous ; flowers papilionaceous ; fruit a legume . . . (Papilionaceæ), Pea Family, p. 89

Numerous, distinct ; flowers regular of 4 or 5 sepals and petals ; fruit a legume . . . . . (Mimoseæ), Acacia Family, p. 95

5 or fewer, petals minute and scale-like (or none) ; fruit a loosely covered 1-seeded indehiscent pod enclosed in the persistent calyx ; stipules papery (Illecebraceæ), Sand Mat Family, p. 57

Stamens on a disk, not simulating a calyx tube

Inserted on the inner margin of the disk, as many or twice as many as the petals and alternate with them (usually 5); ovary 1-celled, 1-ovuled; fruit a berry
(Anacardiaceæ), Poison Oak Family, p. 101

Inserted on the outer margin of the disk, as many as the petals and opposite them (petals sometimes wanting); style or stigma 2–4-lobed; fruit a berry or dry pod with 2–4 hard seeds
(Rhamnaceæ), Buckthorn Family, p. 103

5–8, corolla irregular with 4 or 5 unequal petals; ovary 3-celled, ovules 6, only 1 maturing . . . . (Æsculus), Buckeye, p. 102

3–12 (usually 8); flowers perfect with petals, or diœcious and apetalous; fruit of 2 parts, each winged (*f*. Fig. 169, II; *e*. Fig. 172, II)
(Acer), Maple, p. 102

Ovary distinctly inferior.

Stamens perigynous (on the calyx)

Stamens 4–8, sepals and petals 4; ovary 4-celled
(Onagraceæ), Evening Primrose Family, p. 111

Stamens numerous, usually some petaloid, petals and sepals 5; herbage adhesive with barbed hairs
(Loasaceæ), Blazing Star Family, p. 115

Stamens, petals, and sepals numerous; fruit fleshy, 1-celled; spiny, leafless plants . . . (Cactaceæ), Cactus Family, p. 115

Stamens and petals numerous, sepals 5, capsules 3–5-celled; leaves and stems fleshy . . (Ficoideæ), Fig Marigold Family, p. 116

Stamens numerous; ovary 3–5-celled, opening at the top; calyx falling off like a lid, setting free the stamens and producing a tassel-like blossom . . . . . . (Eucalyptus), Gum Tree, p. 110

Stamens epigynous (on the ovary)

Stamens, petals, and sepals 5 (the last very small), styles 2; fruit a pair of seed-like carpels; flowers small in umbels; leaves alternate, compound . . . (Umbelliferæ), Parsley Family, p. 117

Similar to *Umbelliferæ*, except the styles and carpels 4 or 5; fruit a berry, and umbels panicled
(Araliaceæ), Ginseng Family, p. 116

Stamens, sepals, and petals 4; fruit a 1-seeded berry; flowers in cymes or heads; leaves simple, opposite
(Cornaceæ), Dogwood Family, p. 119

DIVISION III. GAMOPETALÆ. Petals united into a cup or tube.

Ovary free from the calyx (superior).

Corolla regular.

Ovary deeply 4-lobed, in fruit forming 4 nutlets
(Borraginaceæ), Borage Family, p. 137

Ovary 2-celled, ovules numerous ; fruit often a berry
(Solanaceæ), Nightshade Family, p. 145

Ovary 2-celled (generally 4-ovuled) ; twining plants
(Convolvulaceæ), Morning-glory Family, p. 132

Ovary 1-celled or imperfectly 2-celled, styles 2-cleft or entire
(Hydrophyllaceæ), Baby-eyes Family, p. 133

Ovary 3-celled with axillary placenta, style 3-lobed
(Polemoniaceæ), Phlox Family, p. 130

Ovary 1-celled with 2 parietal placentæ, style 1, stigmas 2
(Gentianaceæ), Gentian Family, p. 128

Ovary cells as many as petals, style 1, anthers 2-celled, opening by holes at the top . . (Ericaceæ), Heather Family, p. 120

Ovary 1-celled with axillary placenta, stamens opposite the petals
(Primulaceæ), Primrose Family, p. 125

Ovary 5-angled, 1-celled, 1-seeded, styles 5
(Plumbaginaceæ), Sea Pink Family, p. 127

Ovary 2-celled (sometimes 3–4-celled) with 1 seed in each cell (sometimes more in *Plantago major*)
(Plantaginaceæ), Plantain Family, p. 153

Ovaries 2, distinct, with a stigma common to both and united with a crown-like column of stamens ; flowers in umbels ; seeds with a tuft of silky hairs ; plants with milky juice
(Asclepiadaceæ), Silkweed or Milkweed Family, p. 129

Similar to *Asclepiadaceæ*, except that the stamens are distinct and free from the stigma, but the anthers are disposed to cohere with it
(Apocynaceæ), Dogbane Family, p. 130

Corolla irregular. Fertile stamens fewer than the divisions of the corolla.

Ovary deeply 4-lobed, becoming 4 nutlets ; corolla 2-lipped ; aromatic herbs or shrubs . . . (Labiatæ), Mint Family, p. 139

Ovary 2-celled, seeds many on a central placenta, style and stigma 1
(Scrophulariaceæ), Figwort Family, p. 146

Ovary 2-celled with 2 or more parietal placentæ, seeds many ; root-parasites without leaves or green color
(Orobanchaceæ), Broom Rape Family, p. 153

Ovary adnate to the calyx (inferior).

Ovary with as many cells as petals, anthers 2-celled, opening by holes at the top (*f.* Fig. 160, III ; *e.* Fig. 138, III) ; fruit a berry
(Vaccinium), Huckleberry, p. 120

Ovary 2-5-celled (sometimes becoming 1-celled); fruit a berry ; leaves opposite, without stipules
(Caprifoliaceæ), Honeysuckle Family, p. 156

Ovary 2-5-celled ; leaves opposite with stipules, or whorled and without stipules . . (Rubiaceæ), Madder Family, p. 154

Ovary 1-3-celled ; flowers monœcious or diœcious ; trailing or climbing tendril-bearing herbs ; fruit fleshy, indehiscent
(Cucurbitaceæ), Gourd Family, p. 158

Ovary 2-5-celled, with axillary placenta, style 2-5-cleft
(Campanulaceæ), Harebell Family, p. 159

Ovary 2-celled with axillary placenta, or 1-celled with parietal placentæ ; stamens united by both filaments and anthers
(Lobeliaceæ), Lobelia Family, p. 160

Ovary 3-celled, 2 cells empty, fruit 1-seeded ; stamens 3, corolla tubular, slightly irregular, border of the calyx plumose or wanting
(Valerianaceæ), Valerian Family, p. 158

Ovary 1-celled, becoming an akene, stamens united by their anthers (*f.* Fig. 153 ; *e.* Fig. 131) ; flowers many, combined in heads and appearing like a single flower (*f.* Fig. 133 ; *e.* Fig. 110)
(Compositæ), Sunflower Family, p. 161

CLASS I. — GYM′NOSPERMS

Plants destitute of a closed ovary, style, or stigma ; ovules generally borne naked on a carpellary scale, which forms part of a cone. Cotyledons often several.

CONIF′ERÆ. Pine Family

Trees or shrubs with wood of peculiar structure, destitute of ducts, with resinous and aromatic juice. Leaves generally evergreen and needle-shaped or scale-shaped. Flowers destitute of floral envelopes, monœcious or diœcious. Male flowers consisting of stamens arranged in a spike, and resembling a catkin, with pollen sacs at the base of scales, subtended by a cluster of bracts like an involucre. Female flowers consisting of naked ovules at the base of scales arranged in a spike with a cluster of bracts below, in fruit forming a cone with the seeds under the scales or becoming a one- to few-seeded berry.

I. JUNIP′ERUS, Juniper, Cedar

Flowers diœcious, axillary or terminal. Staminate clusters numerous, with scales whorled or opposite, on a central axis, and 2–6 anther cells to each scale. Pistillate clusters of 3–6 fleshy scales, each bearing 1–2 erect ovules. *Fruit a berry. Seeds bony.* Shrubs or low trees, usually branching irregularly, with aromatic wood and thin, shreddy bark. *Leaves either triangular, scale-like, folding over each other, or linear, rigid, pointed, and free from each other.*

II. CUPRES′SUS, Cypress

Monœcious. Staminate clusters small, very numerous, and at the tips of tiny branchlets ; pollen sacs 3–5 at the base of each scale. Fertile clusters erect on short lateral branchlets, *forming, when ripe, roundish or oblong woody cones, consisting of 6–10 very thick, shield-shaped scales, fitting closely together ;* cones maturing in two years in all except the last ; ovules numerous, in several rows at the base of the scales, forming acutely angled seeds. Leaves evergreen, scale-shaped, imbricated. When the tree is allowed to grow naturally, it is pyramidal, or roundish, with rather loose, straggling branches and pointed or rounded at the top. In bloom in winter or early spring.

a. **C. macrocar′pa Hartweg.** MONTEREY CYPRESS. This has dense foliage and *oblong cones* clustered on short stems. It is extensively cultivated throughout California for wind breaks and hedges; also trimmed into the most fantastic shapes, which are supposed to be ornamental.

b. **C. Govenia′na Gordon.** MOUNTAIN CYPRESS. This is a more loosely branched and smaller tree, with the upper branches slender and drooping. *The cones are an inch or less long, and are globose, rarely oblong.* This, too, is cultivated. In its native state it grows throughout the Coast Mountains.

c. **C. Macnabia′na Murr.** This is a small tree with *fine foliage very fragrant, sprinkled all over with white glands*, so that the tree is pale green. The *cones are small, with horn-like projections on the scales.* This also is cultivated, but rarely. It is a native of the mountains of Lake County.

d. **C. Lawsonia′na Murr (Chamæcy′paris).** PORT ORFORD CEDAR. This differs from the other species of *Cupressus* in having flattened, 2-ranked branches, and the *cones ripening in one year. Cones very small, ⅓ of an inch in diameter, globose*, with 8 or 10 flat scales which are bluish green when young. Seeds 2–4 to each scale, somewhat winged. This is a tall, symmetrical tree with slender branches, often drooping. It is frequently cultivated and is a very valuable timber tree. The wood is very fragrant and is used in making chests and cupboards where it is desirable to keep out insects. It is also known as *Oregon Cedar* and *Ginger Pine.* It is found chiefly in the Coast Mountains of Oregon.

III. THU′YA, Arbor-vitæ

Monœcious. Staminate flowers numerous, very small, with 3 or 4 pollen sacs at the base of the 4–6 pointed scales. Fertile clusters at the ends of branchlets. *Cones very small, ½ inch long, soon reflexed, ripening in one year, with 8–12 erect* *scales in pairs, having a pair of winged seeds under all except the top and bottom pair.* These are tall, symmetrical trees, with horizontally flattened branches and scale-shaped, evergreen leaves adnate and decurrent in 4 rows, with the tips free.

T. gigante´a Nutt. This is a very tall tree found in the Coast Mountains of Oregon, in Washington, northern Idaho, and British Columbia. The cones are densely clustered at the ends of the drooping branchlets, and the foliage is a bright, shining green. The bark is thin and fibrous, the wood soft but durable.

IV. LIBOCE´DRUS, Incense Cedar

Similar to *Thuya*, but with *12 or more scales on the staminate cluster and with the cones not reflexed.* These consist of *4–6 thick scales in pairs*, the two largest only bearing seeds. Seeds with unequal wings.

L. decur´rens Torrey. This becomes a large tree in the Sierra Nevada Mountains and has a trunk resembling that of the giant Sequoia. It is also found on almost all the higher hills of the Coast Mountains.

V. SEQUOI´A, Redwood

Monœcious. Staminate flowers small, very numerous near the ends of young shoots, with 3–5 pollen sacs under each scale. Fertile flowers at the ends of branchlets, consisting of *several scales with long-pointed tips which become bristles on the shield-shaped scales of the cone. Each scale is diamond-shaped with lines running to the center, giving the cone a quilted appearance.* The Sequoias are the largest trees on earth. Their leaves are flattened or triangular scale-shaped; the bark very thick, fibrous, and spongy; the wood red and soft, easily split longitudinally, and the bark also cleaving longitudinally. Both species are cultivated in different parts of California.

a. **S. semper´virens Endl.** REDWOOD. Cones small, oblong, of about 20 scales, maturing in one season; *lower leaves flat, 2-ranked; upper leaves, on tall trees, scale-shaped.* This forms immense forests in northern California and extends, along the coast, from southern Oregon to Point Gorda in Monterey County. The specific name arises from its tenacity of life. It sends up new trees in a circle around where a tree has been cut down. In bloom in winter.

b. **S. gigante′a Decaisne.** MAMMOTH SEQUOIA, BIG TREE. *Upper and lower leaves alike, scale-shaped, with long-pointed tips:* cones about 2 in. long of 25–30 scales, requiring two seasons to ripen. This is found in groves in moist, protected valleys in the higher Sierras, from Placer County through Tulare County.

VI. A′BIES, Fir

Tall trees tapering from a rather broad base to a pointed top, with horizontal branches and brittle wood that soon decays. Leaves apparently in 2 ranks, generally erect, twisted at base. *Cones erect, near the top of the tree, the scales and seeds falling away from the axes, which remain like candles on a Christmas tree.* The cones are therefore never found under the trees, only the fallen scales.

a. **A. con′color Lindl.** WHITE FIR. Large trees with old bark rough, gray, and furrowed. *Leaves pale green, obtuse.* Cones 3–5 in. long, green or purple when ripe. This is the common fir of middle elevations in the Sierra Nevada Mountains. It also extends into Oregon.

b. **A. gran′dis Lindl.** Tall and large trees with smooth, brownish bark. *Leaves dark green and glossy on the upper surface,* with 2 white lines on the lower, obtuse or notched at apex. Cones 2–4 in. long. This is probably the tallest fir in the world. It is found near the coast from northern California to British Columbia and is one of the most important sources of lumber.

VII. PI′CEA, Spruce

Tall trees, shaped as the firs, and with soft but strong wood. Leaves *sessile,* spirally arranged, falling from the branchlets as soon as dry and leaving the stems covered with numerous tiny projections, sometimes appearing in 2 ranks. *Cones drooping, growing on the upper branches, falling to the ground when ripe and always to be found under the bearing trees with the scales spirally arranged on the axes.*

a. **P. Sitchen′sis Carr.** TIDELAND SPRUCE. Very tall and large trees with thin, scaly, brownish red bark. Leaves slender, sessile, with short points at the apex. Cones 1½–3 in. long, yellowish.

This is one of the most important trees of the northern Pacific coast and is probably the largest spruce in the world. It extends from northern California to Alaska.

b. **P. Engelman′ni Engelm.** ENGELMANN SPRUCE, WHITE SPRUCE. Bark light cinnamon-red, broken into thin loose scales. Young trees of pyramidal outline; old trees in forests with long straight trunks and pyramidal at top. Leaves stiff, ending in a sharp tip. Branchlets pubescent. Cones cylindrical, about 2 in. long. Wood white, valuable as timber. This replaces the preceding species east of the Cascade Mountains.

VIII. TSU′GA, Hemlock Spruce

Similar to the true spruces but with *flatter leaves, having short petioles joined to a hard, woody, persistent base.* Seeds resinous on the surface and cones smaller. Tall trees of pyramidal outline and slender, drooping branchlets.

a. **T. heterophyl′la Sargent.** Bark thick, reddish brown. Cones less than an inch long, ovate. This is found along the coast from northern California to Alaska and is one of the most important timber trees.

b. **T. Mertensia′na Sargent (T. Pattonia′na).** PATTON'S SPRUCE, HEMLOCK SPRUCE. Trees with thick, cracked bark, reddish gray and apt to be scaly. Cones long and slender, 2–3 inches in length. Seeds with wings almost twice their length. This is shrubby at great elevations, but when favorably situated becomes a tree more than a hundred feet high. The apex is slender and pendent and the trunk generally slopes at base. It is found in the higher Sierra Nevada Mountains and northward to Alaska, where it grows along the coast.

IX. PSEUDOTSU′GA, Douglas Spruce

Flowers monœcious, from the axils of last year's leaves. Staminate clusters subtended by conspicuous involucres of bud scales; pollen scales with 2 oblong pollen sacs tipped by an awl-shaped spur. Fertile clusters near the ends of branchlets, dark red or yellowish green, with scales concealed by 2-lobed, long, pointed bracts. Cones oblong, drooping, maturing in one year, but remaining on the trees after the seeds have fallen out. The leaves are flat and 2-ranked, on short petioles. This can easily be distinguished from other conifers by the *fringe-like bracts over the scales of the drooping cone.*

P. mucrona´ta Sudw. (P. Douglas´ii Carr), (incorrectly called Oregon Pine and Red Fir). This is found in California and Oregon, and usually grows near streams. It becomes a very tall tree. The wood is yellow or reddish and rather coarse, and the bark is fissured.

X. PI´NUS, Pine

Monœcious. Staminate clusters crowded at the base of the young shoots of the season ; pollen scales spirally arranged, forming an elongated, cylindrical cluster, with 2 pollen sacs to each scale (Fig. 1, *2*). Fertile flowers of spirally arranged carpel scales on an axis, each scale bearing 2 ovules at base (Fig. 1, *3*). Fruit a cone ripening the second year, but often remaining unopened on the tree several years. Leaves evergreen, needle-shaped, in bundles of from 2–5, enclosed in a sheath of membranous scales (Fig. 1, *d*). Seeds generally winged (Fig. 1, *4*).

a. **P. Lambertia´na Dougl.** Sugar Pine. *Leaves 5 in a sheath, 3–4 in. long.* Cones long, narrow, cylindrical, from a *foot* to more than *2 ft.* long when fully grown, pendent at the ends of the branches the second year, *the scales without knobs or prickles.* This is a very tall and large pine, with the upper branches widely spreading and with irregular and picturesque outlines. It is common in the Sierra Nevada Mountains at moderately high elevations and on most of the high peaks of the Coast Mountains, extending into Washington and Oregon.

b. **P. montic´ola Dougl.** Small Sugar Pine. This is a smaller tree than the preceding but similar, with *leaves 5 in a sheath, about 2 in. long. Cones 3–8 in. long,* with the scales without knobs or prickles, reflexed when the seeds are ripe. This is common in the higher Sierra Nevada Mountains, especially northward, and extends into Oregon and Washington at lower elevations.

c. **P. pondero´sa Dougl.** Yellow Pine. *Leaves 3 in a sheath,* 5–11 in. long, rather thick. *Cones oval, 3–5 in. long, sessile,* spreading or recurved, generally several together; scales with stout prickles. Wings on the seeds not quite an inch long, widest above the middle. This is one of the largest pines of the coast. It is found in the mountains in the same region as the Sugar Pine but more widely distributed. The variety **Jeffreyi** is found generally at higher elevations and has longer, coarser leaves, and much larger cones. This is the most widely distributed species and one of the most prized timber trees.

d. **P. contor′ta Dougl.** *Leaves 2 in a sheath*, short. Cones small and slender, 1–3 in. long, whorled, oblique, often remaining closed for many years; *scales with strong knobs and delicate prickles.* This is a small tree. It is found along the coast from California to Alaska.

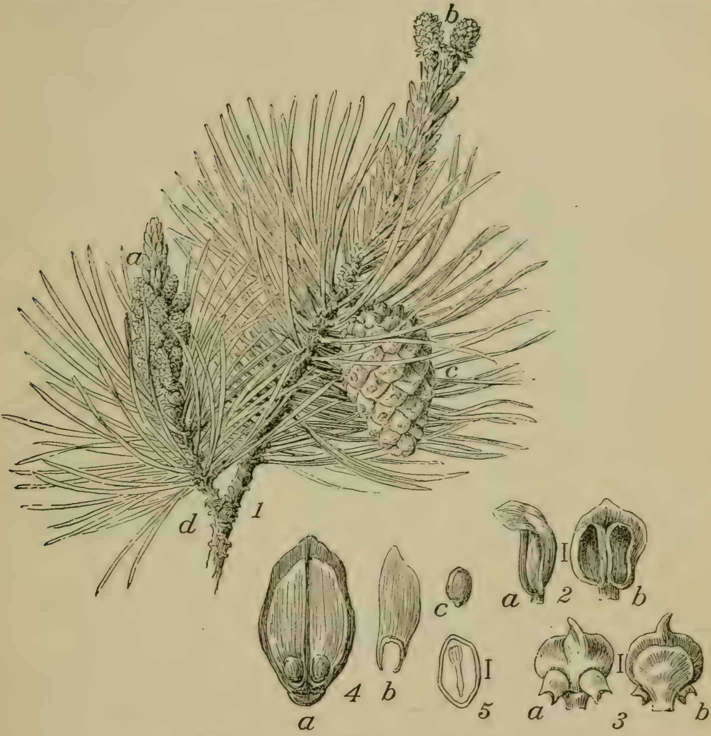

FIG. 1.—Scotch Pine (*P. sylvestris*).

1, a twig showing: *a*, staminate catkins; *b*, pistillate catkins; *c*, a cone; *d*, needles. *2*, an anther: *a*, side view; *b*, outer surface. *3*, a carpel scale: *a*, inner surface; *b*, outer surface. *4*, a cone scale, a seed wing, and a seed. *5*, section of a seed, showing the embryo. *1* is natural size; the other parts of the figure are magnified by the amount indicated by comparison with the vertical line alongside each.

The variety **Murrayana** is a tall, straight tree, growing in the mountains and known as Lodge-pole Pine, from the use made of the slender, straight stems by the Indians. It is widely distributed and variable.

e. **P. radia´ta Don (P. insig´nis Dougl.).** MONTEREY PINE. *Leaves 3 in a sheath*, 4–6 in. long, slender, lax, closely serrate, bright green, densely clustered. *Cones encircling the stem, deflexed on short stems, pointed, curved inwards, owing to the difference between the inner and outer scales.* The cones remain on the tree two or more years without opening. This pine is most extensively cultivated in California for wind-breaks. It grows nearly 100 ft. in height.

f. **P. attenua´ta Lemmon (P. tubercula´ta Gord.).** KNOB-CONE PINE. *Leaves 3 in a sheath*, 4–7 in. long. *Cones in whorls, often with several whorls in a bunch, strongly reflexed on short stems, oblique*, tapering to a very narrow base, with the apex pointed; *the outer scales are enlarged and conical, the inner flatter, both tipped with stout prickles.* The cones persist on the stems and branches many years without opening. This is a small tree and often begins to bear cones when a foot or two high. It is found in the Coast Mountains and in the foothills of the Sierra Nevada Mountains.

g. **P. Sabinia´na Dougl.** NUT PINE, BULL PINE, DIGGER PINE. *Leaves 3 in a sheath, 8–12 in. long, light glaucous green, slender, drooping:* cones massive, short-oval, 6–10 in. long, 5–7 in. in diameter near the base, *deflexed on short, stout stems; scales with stout, claw-like projections.* The nuts are edible and have a stony shell, and formed an important part of the food of the Digger Indians. This tree generally has loose spreading branches and is very graceful. The long light-green foliage easily distinguishes it from other pines. The cones often remain on the branches several years after the seeds have fallen out. This pine is the most common in the foothills of the Sierra Nevada Mountains and in the valleys of the Coast Mountains.

CLASS II. — AN´GIOSPERMS

Plants with a closed ovary, in which the seeds are matured. Cotyledons 1–2.

SUBCLASS I. — MONOCOTYLED´ONOUS PLANTS

Stems with the fibro-vascular bundles scattered amid the parenchyma cells (*f.* Fig. 52; *e.* Fig. 54); in perennial plants no annual rings of wood. Leaves usually parallel-veined, alternate, nearly entire. Parts of the flower generally in threes (never in fives). Cotyledon 1.

GRAMIN´EÆ. Grass Family

Mostly herbs, with usually hollow stems, closed and enlarged at the nodes. Alternate leaves, in 2 ranks, with sheathing bases, which are split open on the side opposite the blade. The flowers are nearly or quite destitute of floral envelopes, solitary, and borne in the axils of scaly bracts called glumes, which are arranged in 2 ranks overlapping each other on 1–many-flowered spikelets; these are variously grouped in spikes, panicles (*f.* Figs. 136, *A, B, C*; *e.* Fig. 183), and so on. The fruit is a grain.

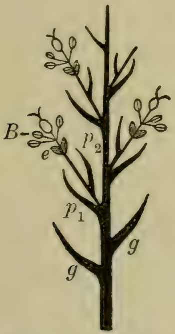

FIG. 2. — Diagram of Inflorescence of a Grass.

g, sterile glumes; p_1, a flowering glume; p_2, a scaly bract (palea); *e*, transparent scales (lodicules) at the base of the flower; *B*, the flower.

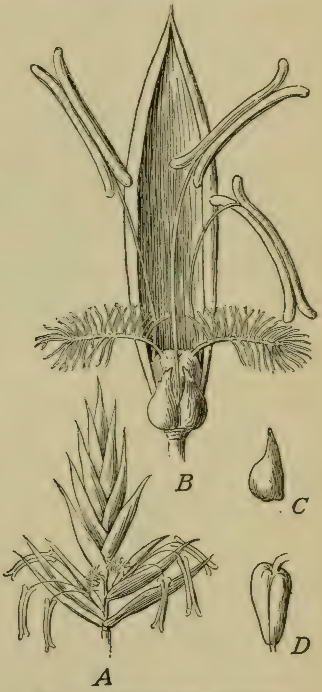

FIG. 3. — Fescue-grass (*Festuca pratensis*).

A, spikelet (compare Fig. 2); *B*, a flower, the lodicules in front and the palea behind; *C*, a lodicule; *D*, ovary.

(The family is too difficult for the beginner, but the structure and grouping of the flowers may be gathered from a careful study of Figs. 2, 3.)

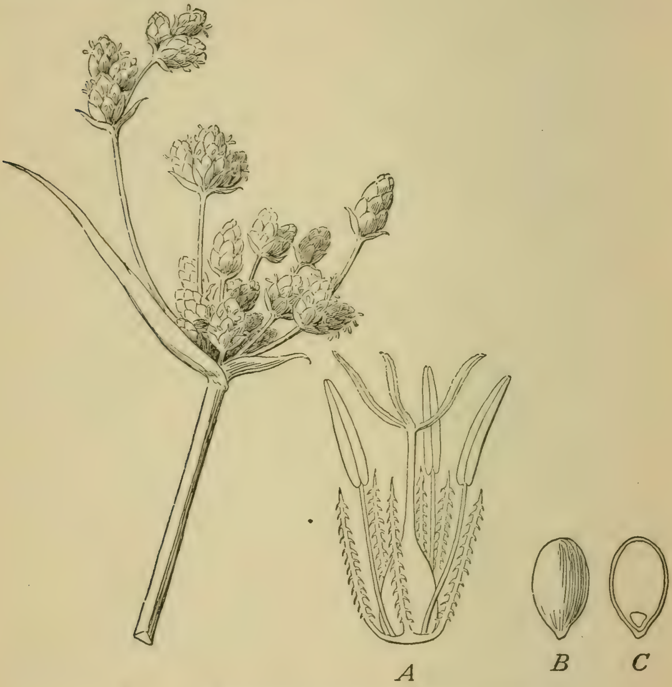

FIG. 4.—Inflorescence, Flower, and Seed of a Sedge.
(Great Bulrush, *Scirpus lacustris.*)

A, magnified flower, surrounded by a perianth of hypogynous bristles; *B*, the seed; *C*, section of the seed, showing the small embryo enclosed in the base of the endosperm.

CYPERA′CEÆ. SEDGE FAMILY

Grass-like or rush-like herbs, with solid, usually triangular stems, growing in tufts. The sheathing base of the generally 3-ranked leaves, when present, is not slit as in grasses. The flowers are usually somewhat less enclosed by bracts than those of grasses; the perianth is absent or rudimentary; stamens generally 3; style 2-cleft or 3-cleft.

The flower cluster and the flower may be understood from an inspection of Fig. 4.

The species are even more difficult to determine than those of grasses.

ARA′CEÆ. ARUM FAMILY

Smooth, perennial herbs, generally growing in wet places. Leaves large, radical or alternate. Flowers sessile, crowded on a spadix which is surrounded by a broad sheathing spathe. Perianth in our representative with 4 divisions. Ovary 2-celled and 2-ovuled. Fruit consisting of berries which coalesce on the spadix.

LYSICHI′TON, Skunk Cabbage

Leaves large, 1–3 ft. long and often a foot broad, growing from a thick rootstock. Spadix at first covered by a yellowish green spathe, later extending beyond it on a stout peduncle. Flowers covering the spadix. Stamens 4, opposite the segments of the perianth, with 2-celled anthers opening upwards.

L. Kamtschatcen′sis Schott. This is found in swamps from northern California to Alaska. It blooms in May and June. It is a beautiful plant with large, broad leaves, covering the swamps, but it has a strong and disagreeable odor, from which the common name is derived.

LILIA′CEÆ. LILY FAMILY

Herbs. Flowers regular and symmetrical, with their parts 3 or some multiple of 3. Ovary 3-celled, free from the perianth. Fruit a capsule or berry. Seeds with endosperm (*f.* Fig. 5; *e.* Fig. 8, 1).

I. AL′LIUM, Wild Onion

Plants with the odor and taste of onion. Scape from a coated bulb. Involucre with papery bracts. *Pedicels not jointed under the flowers.* Perianth rose-color or white. Stamens 6, with filaments broadening towards the base, attached to the perianth. *Ovules 2 in each cell of the ovary*, rarely all ripening. (There are many species, difficult to determine. The most common are given.)

a. **A. serra′tum Watson.** Scape nearly a foot high. Perianth dark rose-color, with divisions in 2 sets, dissimilar. Ovary with wart-like crests at summit. *Outer bulb coats marked with a horizontally zigzag veining which tears readily along the veins.* This is common and abundant wherever found.

b. **A. unifo′lium Kellogg.** Scape usually 2 ft. or more high. Flowers pale rose-color or white, from 10 to 30 in the umbels. *Ovary smooth at summit. Bulb propagating by a side offshoot*, the white outer coats marked by a delicate, complicated veining. This grows in wet places and generally has more than one leaf.

c. **A. acumina′tum Hook.** CRIMSON-FLOWERED ONION. Scapes 4–6 in. high, from a bulb with outer coats, not fibrous, but marked with hexagonal or quadrangular venation. Leaves narrowly linear. Bracts of the involucre 2. *Flowers crimson, on pedicels nearly an inch long, in erect umbels. Segments of the perianth recurved, with long, pointed tips, the inner ones wavy and minutely serrate.* Generally growing in adobe soil, blooming in spring and early summer. It is found chiefly on the eastern side of the Sierra Nevada Mountains and north to British Columbia.

d. **A. attenuifo′lium Kellogg.** Scape slender, from 6 in. to more than a foot high. Leaves narrow, becoming thread-like at tip. Bracts of the umbel 2, short, acute. Umbel with many white flowers. Segments of the perianth pointed, longer than the stamens. *Ovary with 6 crests at summit. Bulb coats often reddish, with a fine, wavy veining.* This is found in wet places in the Coast Mountains, in the Sierra Nevada Mountains, and it extends into Oregon.

e. **A. falcifo′lium H. and A.** *Scape low, flat, 2-edged. Leaves 2, flat, broad, sickle-shaped.* Bracts 2. Flowers deep crimson, the segments of the perianth edged with minute, glandular teeth. *Capsule pointed with short, narrow crests.* Bulb large and globular, the markings on the coats not distinctive. This is found in sandy or gravelly places on the hills of the Coast Mountains, especially northward, extending to Oregon.

II. MUIL′LA

Similar to *Allium, but without the odor and taste.* Flowers greenish yellow. Bracts of the umbels from 4 to 6, linear-lanceolate. *Ovules 8–10 in each cell of the ovary.*

M. marit′ima Watson. This is found in the interior of the state and along the coast, frequently growing in alkaline soil. The flowers have a delicate perfume.

III. BLOOME′RIA, Golden Stars

Perianth of 6 nearly equal, spreading divisions; light orange, with a dark midnerve of 2 closely parallel lines. Pedicels jointed under the perianth. *Stamens 6, with slender filaments nearly as long as the perianth,—each, at base, attached to a short 2-toothed, hairy appendage; these uniting to form a cup at the base of the perianth.* Ovules several in each cell of the ovary.

B. au′rea Kellogg. GOLDEN BLOOMERIA, GOLDEN STARS. Bulb small, densely covered with brownish fibers. Flowers usually numerous in the umbel. Capsule beaked with the persistent style. From Monterey to San Diego, and abundant wherever found.

IV. BRODIÆ′A, GENERALLY KNOWN AS BRODIÆA, SOMETIMES CALLED Wild Hyacinth

Corm coated with brownish fibers (sometimes tissue-like), flat on the bottom when the old part is removed. Leaves generally withering soon. *Pedicels of various lengths, jointed under the perianth.* Flowers withering and persisting, white, blue-purple, rose-color, yellow, or scarlet; in shape tubular, rotate, or funnel-form. Stamens in 2 sets, 3 or 6, attached to the tube of the perianth, often with wing-like appendages on the filaments; when 3, alternating with petal-like staminodia. (Staminodia are filaments, usually broadened, without anthers.)

(There are 5 subgenera which Professor Greene regards as genera; so, to avoid confusion, the species are arranged under the subgenera.)

SUBGENUS **DICHELOSTEM′MA.** *Perianth tubular, 3 stamens with erect anthers and wing-like appendages on each side of the filaments, the other 3 free or reduced to staminodia.*

a. **B. capita′ta Benth.** GRASS NUTS, BRODIÆA, WILD HYACINTH (often incorrectly WILD ONIONS). Flowers blue-purple (rarely white), in a close umbel, like a head. Bracts of the involucre membranous, dark purple. *Stamens with anthers 6, the inner anthers nearly sessile with wing-like appendages, the outer free, on short filaments; the appendages of the inner anthers form a crown in the throat of the perianth.* This is abundant and widely distributed. The children eat the bulbs and call them "grass nuts."

b. **B. volu′bilis Baker (Strophilir′ion).** TWINING HYACINTH. Perianth rose-color, with a 6-angled tube nearly as long as the divisions. *Three stamens with anthers and wing-like appendages, 3 emarginate staminodia. Scape long, twining snake-like around other stems.* The color of the flowers and shape of the umbel might lead one to suppose this a wild onion. It is common in the foothills of the Sierras and is found also in the Coast Mountains.

c. **B. coccin′ea Gray (Brevoor′tia).** FIRECRACKER FLOWER. Perianth with a scarlet tube nearly an inch long, and 6 short and broad green divisions. *Three stamens with wing-like appendages, 3 staminodia.* The staminodia and appendages are yellow. The scape is long and wavy, but not twining. These brilliant flowers hang, as if too heavy to stand erect on their slender pedicels. Northern California.

SUBGENUS **HOOK′ERA.** *Perianth tubular-funnel-shaped with a spreading border. Flowers purplish blue, lighter colored at base, thick in texture. Pedicels unequal. Stamens 3, with erect anthers alternating with 3 petal-like staminodia.*

d. **B. grandiflo′ra Smith.** Scape from a few inches to a foot in height. Pedicels 3–10, curved outwards and upwards, from 1 to 4 in. long. Anthers twice as long as the slender filaments. *Staminodia white, tongue-shaped, as long as the anthers.* The flowers of this are sometimes nearly an inch long. This blooms in summer later than other species growing in the same localities. Quite common.

e. **B. terres′tris Kellogg.** GROUND LILY. Scape scarcely appearing above the surface of the ground. Flowers smaller than the last. *Staminodia yellowish, emarginate, folded backwards.* Common in central California and extending northwards.

SUBGENUS **CALLIPRO′RA.** *Stamens 6, with versatile anthers. Filaments attached to the throat of the perianth, winged their entire length, 3-forked at top, with the anther on the middle prong.*

f. **B. ixioi′des Watson.** GOLDEN BRODIÆA. Perianth funnel-form, with short tube and spreading divisions which are yellow with a brown midvein. Capsule on a stipe.

SUBGENUS **TRITELE′IA.** *Stamens 6, 3 on the throat, 3 below on the tube, with no appendages on the filaments. Anthers versatile. Capsule on a stipe.*

g. **B. lax′a Watson.** GRASS LILIES, ITHURIEL'S SPEAR, BLUE MILLA. Scape erect from 1 to 2 ft. high. Flowers usually many, on pedicels 2–4 in. long, blue to violet (sometimes white). *Perianth funnel-form, narrow at base.* Capsule on a prominent stipe. This is common and very lovely. The flowers are sometimes an inch or more long. From Kern County to northern Oregon.

h. **B. Douglas′ii.** Scape stout, erect, a foot or two high. Leaves keeled. Flowers blue, on short pedicels. *Perianth broadly tubular,* with lobes about as long as the tube. Oregon and Washington.

SUBGENUS **HESPEROCOR′DUM.** *Stamens 6, filaments without appendages, equal, dilated, and united at base.*

i. **B. lac′tea Watson.** Scape slender, from 1 to 2 ft. high. Flowers numerous, on pedicels from 1 to 2 in. long. Perianth funnel-form, thin in texture, white with a green midvein on each division. Anthers yellow or purple, erect. Capsule almost round, beaked by the pointed style, stipitate. In northern California and north to Washington.

V. LIL′IUM, True Lilies

Flowers in racemes or whorls on tall, leafy stems. *Bulbs formed of thick, lanceolate scales.* Perianth deciduous, funnel-form, with 6 nearly equal, spreading divisions. Anthers linear, versatile, on long filaments. Ovary sessile. Fruit a pod, with 2 rows of flat seeds in each cell. Leaves often in whorls, *net-veined.* Bracts leaf-like. Nectary a narrow groove.

a. **L. Washingtonia′num Kellogg.** WASHINGTON LILY. Stems simple, from 2 to 5 ft. high. Leaves in whorls of from 6 to 10, oblanceolate. *Flowers large, pure white, or dotted with purple, fading purplish, from 2 to 20, hanging on ascending pedicels in a simple or compound raceme.* Perianth divisions not recurved. The flowers are fragrant, from 3 to 4 in. long and spreading nearly as wide. This fine lily generally grows in the shade, in the higher Sierra Nevada Mountains and in Oregon.

b. **L. pardali′num Kellogg.** TIGER LILY, LEOPARD LILY. Stems simple, 3–7 ft. high, from a bulb like a thick rootstock, forming clumps. *Leaves acuminate in whorls of from 9 to 15*, lanceolate, pointed, 3-nerved, varying in width. Flowers in racemes, the lowest often whorled, nodding at the ends of long spreading pedicels. *Perianth orange below, spotted with reddish purple;* segments curled backwards. Anthers red. This is frequent along streams under the trees, in the Coast and Sierra Nevada Mountains.

c. **L. Humbold′tii Roezl. and Leicht.** HUMBOLDT'S LILY, TIGER LILY. Stems stout, purplish, 4–8 ft. high, from bulbs 2–6 in. in diameter composed of fleshy, ovate-lanceolate scales 2–3 in. long. *Leaves large, with undulate, rough margins*, in 4–6 whorls and with 10–20 in each whorl. *Flowers large, drooping, on stout widely spreading pedicels which are from a few inches to nearly a foot long. Segments of the perianth 3–4 in. long, reddish orange, spotted with purple*, curled back. Stamens about equaling the style, anthers red. Capsule large, sharply 6-angled. This blooms in summer and is frequent in the foothills of the Sierra Nevada Mountains and south to near San Diego.

d. **L. par′vum Kellogg.** SMALL TIGER LILY. Stems slender, 1 to more than 6 ft. high, from a small bulb composed of short, thick, jointed scales. Leaves scattered or in whorls, 2–5 in. long. *Flowers small, erect, or nearly so, on slender, almost erect pedicels. Segments of the perianth about an inch long, orange, spotted with purple*, reddish at the recurved spreading tips. Stamens almost as long as the style. Capsule roundish, less than an inch long. This is frequent in the Sierra Nevada Mountains and north to Oregon.

e. **L. Columbia′num Hanson.** Bulb small, with fleshy white scales closely folded over each other. Stems slender, 2–3 ft. high. Upper and lower leaves scattered, the others in whorls of 5–several, oblanceolate. Flowers nodding, few or many, on scattered, slender, curving pedicels. Perianth *bright orange spotted with purple, the segments 1–2 in. long*, revolute. Anthers yellow. Capsule an inch long, 6-angled. This beautiful lily is common in Washington and Oregon and is found in northern California.

VI. FRITILLA′RIA, Mission Bells, Rice Roots

Stems simple, leafy. *Bulb with round, thick scales, often like grains of rice.* Flowers in racemes, nodding on rather short pedicels. Perianth bell-shaped with separate divisions, nectary a shallow pit.

a. **F. lanceola′ta Pursh.** CHECKERED LILY. Leaves in from 1 to 3 whorls, lanceolate, 2–5 in. long. Flowers on slender pedicels, checkered variously in dark purple and greenish yellow. Pods with winged angles. *Bulb solid, not dividing into scales, but with rice-like grains over the whole upper surface.* In the Coast Mountains extending to British Columbia.

b. **F. biflo′ra Lindl.** CHOCOLATE LILY. Leaves scattered or sometimes whorled. Flowers 1–3, brownish red or sometimes greenish purple. Pod angled but not winged. *Bulb composed of thick, separable scales and without rice-like grains.* More common southward.

c. **F. recur′va Benth.** Stem rather stout and tall, generally more than a foot high. Leaves linear-lanceolate, in 2 whorls near the middle of the stem. *Flowers 1–9, scarlet spotted with yellow, obtuse at base.* This is found in the Sierra Nevada Mountains and it extends northward into Oregon.

d. **F. coccin′ea Greene.** This is similar to the above, but *the flowers are acute at the base.* It is found in the Coast Mountains.

e. **F. atropurpu′rea Nutt.** Stem 6 in. to a foot high. *Leaves scattered or whorled.* Flowers dull purplish or greenish, often imperfect, less than an inch across when expanded. *Pod with 3 short angles, broadest at the top.* From northeastern California to the Columbia River.

f. **F. pu′dica Spreng.** Stems 3–8 in. high. Leaves few, scattered or whorled. *Flowers generally solitary, yellow or orange and tinged with crimson.* Pod oblong, with angles obtuse. From east of the Sierra Nevada Mountains to British Columbia.

VII. ERYTHRO′NIUM, Dog-tooth Violet, Adder's Tongue

Scapes from an oblong, deep-seated corm, generally with a tooth-like offshoot. *Leaves broad, often mottled with brownish red, generally 2 at the base, spreading in opposite directions. Flowers one or several in an umbel. Perianth nodding, open bell-shaped,* of 6 recurved divisions. Stamens 6, with erect anthers and slender filaments. Pods 3-sided.

a. **E. gigante′um Lindl.** Scape from 10 to 15 in. high. Flowers 1–6 in an umbel. Leaves often mottled, 6–10 in. long. Flowers cream-color, often tinged with pink or brown, yellow in the center. *Segments 1–2 in. long, much recurved.* In the Coast Mountains from Sonoma County to Washington.

b. **E. Hartwe′gi Watson.** Scape shorter. *Leaves generally mottled, sometimes 3.* Flowers pale yellow, orange at the center, with segments 1–1½ in. long, recurved but little. *Flowers on slender stems, from 1 to 5, in a sessile umbel.* This is found in the Sierra Nevada Mountains.

c. **E. grandiflo′rum Pursh.** *Leaves not mottled.* Flowers 1–6, yellow or cream color, with the base of the perianth white. Anthers purple.

Pods oblong, narrowed at base. This is common in Washington and Oregon.

VIII. YUC′CA, Spanish Bayonet, Soapweed

Leaves stiff and pointed like daggers, growing in a bunch. Flowers in a raceme or panicle. Perianth of 6 thick divisions, bell-shaped, nodding. Stamens with thick filaments attached to the base of the perianth. Ovary sessile. Stigmas 3, united. Fruit with cells incompletely divided. Seeds black, flat, 2 rows in each cell.

a. **Y. Whip′plei Torr.** Scape 4–12 ft. high and about 2 in. in diameter, clothed with sharp-pointed bracts close to the stem, rising from amidst a thick bunch of narrow, dagger-like leaves. Flowers in a panicle. Segments of the perianth cream-color, 1–2 in. long. The plant from which the scape springs dies after fruiting; but the dead scapes often remain standing like slender white posts on the hillsides.

b. **Y. arbores′cens Torr.** This is the tree Yucca of the Mojave Desert. *f.* Part I, Plate VII.

IX. CALOCHOR′TUS, Butterfly Tulip, Mariposa Lily

Perianth with 3 outer segments sepal-like, the 3 inner petal-like, each with a large honey-gland near the base, densely covered with hairs. Flowers erect or drooping, solitary, in racemes or in umbels, beautifully and variously colored. Stamens 6, with erect anthers. Seeds in 2 rows in each cell of the ovary.

a. **C. alb′us Dougl.** SATIN BELL, HAIRY BELL, ALABASTER TULIP. Flowers white, or pinkish with a satiny texture. *Segments of the perianth curved inwards, forming a close roundish bell in shape something like a sleigh bell, very hairy within.* Gland crescent-shaped, almost concealed by the long hairs of the perianth. Anthers linear-oblong, tipped by a blunt point. Capsule winged. The stems are rather tall, leafy and branching, bearing numerous flowers. This grows on shady banks in the Coast Mountains.

b. **C. pulchellus Dougl.** GOLDEN BELLS. Flowers shaped as the preceding, *yellow, hairy within and on the margins;* flowers rather few. This has been mistaken for the next, which is much commoner.

c. **C. amab′ilis Purdy.** DIOGENES' LANTERN. Similar to the above, but the flowers are more numerous, smaller, and *the segments of the perianth curve inwards so much that they overlap, hairy on the margin only.* This is common in northern California.

d. **C. amœ′nus Greene.** Rosy Bells. This is similar to *C. amabilis* in form, but is *deep rose-color.* It grows in the foothills of the southern Sierra Nevada Mountains.

e. **C. Ben′thami Baker.** Yellow Star Tulips. Flowers bell-shaped with incurved petals, *erect when open. Petals yellow*, densely covered with yellow hairs, the gland shallow and crescent-shaped above the brown claw. Capsules nodding on slender recurved pedicels. Low slender plants with from 2 to 6 flowers. Common in the Sierra Nevada Mountains from Mariposa to Siskiyou County.

f. **C. Mawea′nus Leicht.** Mouse-ears. Flowers less than an inch in diameter, with spreading divisions, *erect in full bloom*, *white or bluish.* Inner divisions of the perianth densely covered with long white or purplish hairs. Honey-gland semicircular. Anthers pointed. Capsule winged, nodding. Stems low, branched, with from 3 to 6 flowers. Common in northern California. Spring.

g. **C. el′egans Pursh.** Scape 2–3-flowered, generally shorter than the single grass-like leaf. Flowers on short thread-like pedicels which are not much longer than the bracts. Petals about ½ inch long, *white, with a smooth purple spot at base, covered on the inside with purple down. Pods nodding.* The roots are eaten by the Indians. It is found from Oregon and Idaho to British Columbia. Spring.

h. **C. uniflo′rus H. & A.** Scapes erect with 1–3 flowers. *Petals lilac*, an inch long, with the upper margin denticulate; *gland purple, densely hairy*, with a few scattered hairs on the petal above. *Pods nodding.* This is found in middle California near the coast. Spring.

i. **C. umbella′tus Wood.** Scapes low and often decumbent. Flowers generally many in 1–3 umbels or corymbs on long slender pedicels. Petals white or tinged with pink about ½ inch long, with some hairs on the lower half; gland covered with a narrow scale. *Pods obtuse at each end, nodding.* This is found on slopes of hills in the Coast Mountains of middle California. Spring.

j. **C. nu′dus Watson.** Low and slender with one leaf. Flowers 1–6 in one umbel. Petals white or pale lilac, fan-shaped, denticulate on the upper margin, *wholly without hairs;* gland shallow, divided by a transverse, denticulate scale. *Pod acute at each end, nodding.* This is found in the Sierra Nevada Mountains from the Yosemite northward. Early summer.

k. **C. clava′tus Watson.** Erect stems a foot or two high. *Flowers tulip-shaped*, erect. Sepals yellow on the inner side, with a brownish spot at base, greenish on the outer side. Petals yellow, with a deep, round gland surrounded by *yellow, club-shaped hairs.* Anthers purple, obtuse. Pod erect, narrowly oblong, with thick, obtusely angled cells. Southern California. Early summer.

l. **C. Weed′ii Wood.** Stem branching, leafy, a foot or more high. Sepals as long as the petals, orange on the inner side with a brown spot at base. Petals 1–1½ in. long, *fan-shaped, deep yellow, dotted and often margined with brownish purple, covered with slender yellow or purple hairs:* gland small, round, densely hairy. Pod erect, narrowed to the top, 1½ in. long. The variety **purpuras′cens Watson** has the *petals wholly purple or blotched with purple.* These are common in southern California. Early summer.

m. **C. lu′teus Dougl.** GOLDEN TULIP. Flowers *erect, tulip-shaped, greenish yellow,* and variously marked with brownish purple, slightly hairy within. Honey-gland round or crescent-shaped, densely covered with yellow hairs. Anthers yellow, linear-oblong, obtuse. Capsule erect, narrowed towards the top. This is the most widely distributed species and is quite variable. Early summer.

n. **C. lu′teus var. ocula′tus Watson.** This is similar to **C. luteus,** except in the color and markings of the petals. They are white, cream, or purple, with *a central brownish spot which is usually bordered with yellow.* The claw is yellow or purplish, and the gland is narrowly crescent-shaped and covered with brownish or yellowish hairs. This includes a great variety of color forms, and has a wide range. It is the commonest species in the northern Californian valleys, and is found in both the Sierra Nevada and Coast Mountains from Fresno County to Oregon. Early summer.

o. **C. Nuttal′lii Torr. & Gray.** Stem always bearing a small bulb at base. Flowers erect, tulip-shaped, 1–several in umbel-like clusters. Sepals ovate lanceolate with papery margins, generally yellowish within. *Petals white or tinged with lilac,* with a purplish spot above the yellow base. Gland round or oblong, densely hairy, and surrounded by long, scattered hairs. *Anthers obtuse, sagittate at base.* Capsule erect, narrowed upwards. This is found in the Sierra Nevada Mountains, especially northward, to Oregon. Early summer.

p. **C. venus′tus Benth.** BUTTERFLY TULIP. Flowers erect, tulip-shaped, white, often tinged with lilac, or purplish throughout, *generally marked with a red spot near the top of the petals, like a drop of blood.* Honey-gland *narrowly oblong,* hairy. The markings above the glands are beautiful and exceedingly variable. Pods erect. This is widely distributed in various forms. Early summer.

q. **C. splen′dens Dougl.** LILAC TULIP. *Flowers erect, tulip-shaped, lilac above with scattered white hairs, paler beneath.* Gland round, densely hairy, sometimes wanting. Anthers purple, obtuse or acute. Pods erect. This is common in the southern parts of California. Early summer.

r. **C. macrocar′pus Dougl.** Stems stout, erect, 1–2 ft. high, with 1–2 tulip-shaped flowers. Leaves 3–5, narrow, convolute. Sepals about as long as the petals, narrowly pointed, lilac on the inner side. *Petals obovate with pointed apex,* 1½–2 *inches long, dark lilac, paler at* *base and with a greenish line down the middle;* gland oblong, densely hairy, and with some scattered glandular hairs above. Pods erect, narrowed upwards, about 2 inches long. This is found from northern California to Washington and Idaho. Summer.

X. CAMAS′SIA, Camass

Flowers usually deep blue in a simple raceme with papery bracts. Perianth of 6 oblanceolate segments, spreading open. Stamens 6, on the base of the perianth. Style slender, with 3 divisions. This has a coated bulb and grows in swampy places. The flowers are rarely white.

C. esculen′ta Lindl. Scape from 1 to 2 ft. high. Leaves many, near the base, keeled. Style as long as the perianth. Stamens shorter, with awl-shaped filaments and linear, versatile anthers. The bulbs are eaten by the Indians. This grows through middle California and north to Washington. Early summer.

XI. CHLOROG′ALUM, Soap Plant, Amole

Stems almost leafless from a bulb, either fibrous or membranous-coated. *Leaves mostly radical, linear, with very wavy margins.* Flowering branches widely spreading, with the flowers scattered on short pedicels. *Perianth of 6 oblong spreading segments which persist and become twisted over the ovary.* Stamens 6, shorter than the segments, to which they are adnate at base. Capsule 3-lobed, broadest at top, with 1 or 2 black seeds in each cell.

C. pomeridia′num Kunth. SOAP PLANT, AMOLE. Bulb large, covered with coarse brown fibers. Leaves 6–18 in. long, and nearly an inch wide. Flowers with the white segments veined with purple, spreading widely from the very base. Pedicels nearly as long as the flowers. The flowers open suddenly in the afternoon, and are conspicuous on the leafless stems. The bulb is used as a substitute for soap. It is widely distributed and blooms in summer.

XII. ZYGADE′NUS

Stems stout from a deep bulb. Leaves linear, chiefly near the base of the stem. *Flowers in racemes or panicled racemes. Perianth greenish white, spreading star-like, with a greenish* *yellow gland at the base of the segments.* Stamens nearly free, with filaments at first recurved.

a. **Z. Fremon′ti Torr.** Bulb with outer coats almost black. Stems from a few inches to about 4 ft. high. *Racemes simple or compound,* with few or many flowers. Bracts leaf-like. *Flowers from less than a half inch to nearly an inch in diameter.* Perianth entirely free from the ovary; outer segments without a claw, inner with claws. Glands wavy. Stamens shorter than the perianth. Styles short. Capsule oblong, 3-lobed, septicidally dehiscent. Spring.

b. **Z. veneno′sus Watson.** DEATH CAMASS, HOG′S POTATO. Flowers smaller than the preceding, *generally in a simple raceme,* the lower sometimes staminate. Segments of the perianth from triangular-ovate to elliptical, with blades rounded or slightly cordate at base, all with claws. Capsule oblong-ovate with 2 seeds in each cell. This grows in wet meadows or along streams. The bulb is said to be poisonous, except to hogs. Spring.

XIII. SMILACI′NA, False Solomon's Seal

Stems from a horizontal rootstock, simple, leafy. *Flowers white, very small, in a simple or compound terminal raceme.* Anthers versatile on awl-shaped filaments. Fruit a berry.

a. **S. amplexicau′lis Nutt.** Stems from 1 to 3 ft. high. Leaves broad, half clasping the stem. *Flowers very small, in an oblong or pyramidal panicle.* Filaments equaling or even surpassing the divisions of the perianth in length and breadth. Fruit a light-red berry with darker dots. This is common in rich, shady woods. Spring.

b. **S. sessilifo′lia Nutt.** Stems not so tall. Leaves narrower and lighter green. *Raceme simple, with star-like flowers on spreading pedicels.* Stems half as long as the divisions of the perianth. Berry green with red lines, becoming dark red when fully ripe. This is common in shady woods. Spring.

XIV. DIS′PORUM (PROSAR′TES), Fairy Bells, Drops of Gold

Stems from a spreading rootstock, widely branching, leafy. Leaves alternate, sessile or clasping. *Flowers greenish white, bell-shaped, hanging under the leaves from the upper axils.* Fruit an orange or salmon-color berry.

a. **D. Menzie′sii Benth. & Hook.** *Perianth broad at base,* with divisions somewhat swollen. Stamens shorter than the perianth.

Style 3-cleft. Leaves ovate, pointed, often cordate at base. *Fruit a pear-shaped, salmon-color berry.* This grows along the banks of streams in shady woods of the Coast Mountains. Spring.

b. **D. Hook′eri Benth. & Hook.** *Perianth narrow at base*, with spreading segments. Stamens equaling or surpassing the perianth. Leaves ovate, deeply cordate at base, rough to the touch. *Fruit an orange, obovate berry*, somewhat pubescent. This grows in shady woods, but not close to the water. Spring.

c. **D. trachyan′drum Benth. & Hook.** This is similar to the last, with the stamens shorter than the perianth. *Fruit smooth, with a stout beak.* This grows in the Sierra Nevada Mountains. Spring.

XV. CLINTO′NIA

Stems very short from a rootstock. *Leaves all from the base*, large, oblanceolate, sheathing, with many veins and the veinlets transverse. Flowers solitary or on a scape-like peduncle, in umbels or whorls. *Perianth of 6 oblanceolate divisions, soon falling to pieces.* Stamens on the segments of the perianth with thread-like filaments and versatile anthers. Ovary sessile, 2–3-celled. *Fruit a beautiful blue berry*, smooth and glossy. Seeds few to many.

a. **C. uniflo′ra Kunth.** Covered more or less with woolly hairs. Stem above ground scarcely any. Leaves 4–8 in. long, 1–2 in. broad, narrowed at base. *Peduncle shorter than the leaves, bearing 1, or rarely 2, white flowers, erect, nearly an inch across.* This beautiful and delicate flower grows in the woods and is found from northern California to British Columbia. It blooms in late spring or summer.

b. **C. Andrewsia′na Torr.** Almost smooth. Stem 2–6 in. long, bearing 5 or 6 large leaves nearly a foot long and 2–4 in. wide, bright green and very luxuriant, forming a circular bunch around the tall scape, which is a foot or two high. *Flowers generally many, in umbels or whorled fascicles, deep rose-color, pendent.* Perianth broad at base, $\frac{1}{3}$–$\frac{1}{2}$ in. long. This is found in the redwood groves and is in bloom in early summer. It is one of the most conspicuous plants, whether in fruit or flower or with only its tropical-looking leaves.

XVI. STREP′TOPUS, Twisted Stalk

Stems from slender, creeping rootstocks, leafy, glaucous, branching in pairs. Leaves alternate, sessile, lance-shaped, veinlets transverse. *Flowers usually solitary from the leaf* *axils, on slender, simple or forked peduncles, bell-shaped, greenish white, with the divisions recurved at tip.* Fruit a round berry with 3 cells and many seeds.

S. amplexifo′lius DC. Stems 2–3 ft. high. Leaves heart-shaped at base, 2–5 in. long, rough on the margins. Perianth about half an inch long. This is found in damp, shady places from northern California to Washington. It blooms in the spring.

XVII. TRIL′LIUM, Wake Robin

Stems erect, *naked up to the three leaves which are in a whorl under the flower.* Leaves netted-veined, large and broad. Perianth withering, but not falling. Outer divisions (sepals) greenish, inner (petals) colored. Filaments short. Anthers long, erect. Stigmas sessile on the sessile ovary.

a. **T. ses′sile L.** Leaves broad, round-ovate, often mottled with reddish brown, crowded. *Flowers and leaves sessile.* Petals white, rose-color, deep wine-color, or greenish yellow. This is common in woods near the coast. It is exceedingly variable in the size and shape of the leaves and parts and color of the flowers.

b. **T. ova′tum Pursh.** Leaves on short petioles, ovate, acute or pointed. *Flowers on a peduncle from 1 to 3 in. long.* Petals white, turning rose-color as they fade. This has the same range as the preceding, but is usually earlier and less common.

c. **T. petiola′tum Pursh.** Stem short. *Leaves ovate to kidney-shaped, with petioles equaling or longer than the blade.* Flowers sessile. Petals narrowly oblanceolate, a little longer than the sepals, dull purple. This is found through Oregon and Washington.

AMARYLLIDA′CEÆ. CENTURY PLANT FAMILY

Mostly smooth perennial herbs, sending up from the root a scape and leaves which show no distinction between petiole and blade. *Stamens 6. Tube of the 6-parted perianth adnate to the 3-celled ovary.* Capsule 3-celled, several or many seeded. The Chinese Sacred Lily, the Narcissus, Jonquil, and Daffodils belong to this family.

I. AGA′VE, Century Plant, American Aloe

Plants with large, thick, spiny-pointed and spiny-toothed leaves. The flowers are numerous on short bracted pedicels, in spikes or panicles, at the summit of a tall woody scape clothed with bracts. The perianth is thick and fleshy, tubular or bell-shaped, with the 6 divisions nearly equal. Filaments bent in the bud, but becoming straight and extending beyond the perianth. Capsule leathery, with numerous flattened black seeds. Different species of Century Plants are common in cultivation, and several species are native in desert regions. It blooms in California when 10 to 20 years old. "Pulque," a Mexican drink, is made from the sap of some species.

II. NARCIS′SUS, Narcissus, Jonquil

Flowers with a cup-shaped crown at the throat of the perianth. Tube of the perianth somewhat cylindrical, the 6 divisions of the border widely spreading. Stamens 6, inserted in the tube. Scapes with 1 to several flowers from a thin, dry spathe.

N. Tazet′ta. Chinese Sacred Lily. Flowers white, with yellow cup; fragrant. Leaves and scapes from a large bulb, like an onion. This is cultivated especially by the Chinese and usually grows in water. It is in bloom during the winter, about the time of the Chinese New Year, and can readily be obtained for class study.

IRIDA′CEÆ. Iris Family

Herbs with equitant 2-ranked leaves. Flowers showy, perfect. *Tube of the perianth attached to the ovary, which is enclosed by spathe-like bracts. Stamens 3, with anthers turned outwards.* Style 1, stigmas 3, often petal-like. Capsule 3-celled and many-seeded.

I. I′RIS, Blue Flag, Fleur de Lis, Flower de Luce

Sepals 3, turned backwards, larger than the 3 erect petals. Stamens 3, distinct, borne on the sepals. Anthers long, and covered by the petal-like branches of the style. Perennials with dagger-shaped leaves and large rootstocks.

a. **I. macrosi′phon Torr.** Stems low, forming mats of bright green, narrow, erect leaves, amid which the flowers arise, overtopped by the leaves. *Perianth with a slender tube from 1 to 4 in. long*, easily breaking. Flowers dark blue, rarely cream-color.

b. **I. Douglasia′na Herbert.** Taller than the last, but also growing in mats. Leaves dark green, rose-color at base, laxly spreading. Stems bent about the middle. *Tube of the perianth slender, an inch or more long.* Flowers variable in color; cream, rose-color, violet, and purplish blue. This is the most widely distributed species.

c. **I. longipet′ala Herbert.** Stems stout, more than a foot high. Leaves glaucous. Flowers larger than the preceding. *Perianth funnel-form at base, sessile on the ovary.* Sepals from 2 to 3 in. long, beautifully veined with yellow and violet. Petals shorter. Petal-like branches of the style with broad crests. This Iris covers acres of ground in low places near San Francisco.

d. **I. Missourien′sis.** Stems slender, the few leaves shorter than the stem. *Bracts papery, dilated.* Flowers blue, generally 2 in a spathe. Sepals and petals 2 or 3 in. long, with narrow claws. This grows in moist or wet places and is widely distributed. It blooms in spring.

II. SISYRIN′CHIUM, Blue-eyed Grass, Star-eyed Grass

Perianth 6-parted, with the spreading divisions all alike. Stamens monadelphous. Stigmas 3-cleft, very slender, usually twisted together. These are small grass-like perennials, with pretty flowers that soon wither, borne on slender scapes.

a. **S. bel′lum Watson.** Blue-eyed Grass. Stems usually about a foot high. Leaves shorter. Spathes 2, nearly equal, enveloping the flowers in bud. *Flowers 4–7, purplish blue*, yellow at the center. Divisions 3-toothed or tipped with a point. *Stamens with the filaments united to the anthers.* Stigmas short, hardly apparent. Capsule globular. This is common in damp places.

b. **S. grandiflo′rum Dougl.** Scapes about a foot high. Spathe with 1–4 flowers, flattened but not winged, surpassing the leaves. Bracts broad, unequal, the larger exceeding the flowers. Perianth an inch and a half across, *reddish purple*, occasionally white. *Filaments united only at the broad base.* Style merely cleft at apex. This most beautiful species ranges from northern California to British Columbia.

c. **S. Califor′nicum Ait.** Star-eyed Grass, Golden-eyed Grass. Scape winged, a foot or more high, longer than the leaves. Flowers from 3 to 7, *yellow, nearly an inch in diameter.* Spathe 1. Filaments united at base only. Style divided to the middle. Capsule oblong. *This stains the paper purple when it is pressed.* It grows in swampy places near the ocean.

ORCHIDA'CEÆ. Orchis Family

Perennials, with perfect flowers of peculiar shapes, perianth of 6 divisions adnate to the 1-celled ovary, which contains an immense number of ovules. The stamens are 1 or 2, united with the pistil. The pollen is of a few waxy grains, held together by cobweb-like threads. The family is difficult, and the specimens are so rare that they should not be collected in large numbers for class study. The most familiar genera are *Cypripe'dium*, Lady's Slipper; *Spiran'thes*, Ladies' Tresses; *Habena'ria;* and *Epipac'tis.*

SUBCLASS II.—DICOTYLED'ONOUS PLANTS

Stems composed of bark, wood, and pith; in woody stems which live over from year to year, the wood is generally in annual rings, traversed at right angles by medullary rays. Leaves netted-veined. Cotyledons 2 (rarely more).

Division I

APETALOUS PLANTS. FLOWERS WITHOUT A COROLLA, OFTEN WITHOUT A CALYX. CALYX OFTEN COLORED LIKE A COROLLA.

PIPERA'CEÆ. Yerba Mansa Family

Perennial herbs with jointed or scape-like stems. Leaves entire, with petioles dilated at base, and without stipules. Flowers perfect, without perianth, in dense terminal spikes, with a bract under each flower. Stigmas 1–5, stamens 3–6 or more.

HOUTTUY′NIA (ANEMOP′SIS), Yerba Mansa

Herbs with aromatic, creeping rootstocks, and most of the leaves radical. Flowers in spikes, subtended by a corolla-like involucre on a few-leaved stem. Sepals and petals none, a petal-like bract under each flower. Stamens on the base of the ovary. Ovaries, sunk in the fleshy axis of the spike, each consisting of several follicles, which open and appear to form a 1-celled pod with several parietal placentæ; when ripe, opening at the apex, leaving the old spikes full of regularly arranged holes.

H. Califor′nica Benth. & Hook. YERBA MANSA. This grows in saline or alkaline swamps, and has reputed medicinal value.

MYRICA′CEÆ. WAX-MYRTLE FAMILY

Monœcious or diœcious trees or shrubs. Leaves fragrant, alternate. Flowers in short sessile catkins with one naked flower under each scale. Staminate flowers of about 10 stamens with united filaments. Ovary 1-celled, 1-ovuled, with 2 sessile thread-like stigmas. Fruit a small, round, dark purple nut, unevenly coated on the rough surface with grayish white wax.

Myri′ca Califor′nica Cham. Flowers usually androgynous. Leaves evergreen, leathery, oblanceolate, dark green and glossy above, somewhat whitened below, serrate above the base, and narrowed to a short petiole. Catkins solitary or in thick clusters. From Monterey to Washington in moist places.

SALICA′CEÆ. WILLOW FAMILY

Diœcious trees or shrubs. Flowers in catkins (*f.* Fig. 131; *e.* Figs. 108, 121), destitute of perianth. Fruit a 1-celled pod with numerous seeds, provided with rather long and silky down (usually called cotton), by means of which they are transported by the wind.

I. SA′LIX, Willow

Trees or shrubs, growing near water. *Leaves generally long and pointed;* with stipules generally present on young shoots, disappearing from the older leaves. Stamens 1–6 to each scale of the staminate catkin. On the pistillate catkin the pods are small, ovate, pointed, splitting from the top into two pieces. In bud the catkins are covered with scales that fall off. (The following species generally occur as trees, sometimes also as shrubs.)

a. **S. ni′gra Marsh.** Black Willow. *Trunk nearly black, generally leaning over the water.* Leaves narrowly lanceolate, long-pointed, closely serrate, smooth and light green on both sides. Catkins on leafy branchlets. Pods brownish on short pedicels. *Stamens 3–5 to each scale.* Along the San Joaquin and Sacramento Rivers.

b. **S. læviga′ta Bebb.** *Trunk straight, with dark brown bark.* Leaves rather thick, glossy green above, glaucous beneath. Scales of the catkin toothed. Otherwise much like the preceding, but with broader leaves. Widely distributed.

c. **S. lasiol′epis Benth.** Trunk generally straight, with grayish brown bark, almost smooth. Leaves thick, oblanceolate, unequally serrate, glaucous and brown-hairy beneath. *The young leaves are closely covered with silky hairs.* Catkins on very short peduncles; scales dark brown, densely covered with white hairs. *Stamens 2 to each scale, with the filaments united at the base.* Pods on short pedicels. This is the most common willow and varies considerably. Widely distributed.

d. **S. Scouleria′na Barratt (S. flaves′cens Nutt.).** Small tree or shrub. Leaves silky tomentose on the underside when young, obovate or oblanceolate. *Catkins short, sessile, appearing before the leaves,* densely flowered. *Stamens 2 to each scale of the catkin;* scales covered with long silky hairs. Capsules tomentose on short pedicels. Styles wanting; stigmas long, entire or deeply parted. The freshly broken twigs of this species have a strong and disagreeable odor. It is one of the earliest willows in bloom and is very lovely and conspicuous when in bloom. It is found from Santa Barbara to Alaska.

e. **S. Sitchen′sis Sanson.** Similar to the above but with leaves much more tomentose, with permanent and shining tomentum. *Catkins long, appearing before the leaves but often in the axils of the previous season's persistent leaves. Stamens 1–2 to each scale of the catkin;* scales villous and catkins tomentose. This is a beautiful willow with large broad leaves. It is found from Santa Barbara to Alaska.

f. **S. corda′ta Muhl.** Small tree or shrub. Leaves oblong lanceolate, heart-shaped or acute at base, pointed at apex, serrate, smooth except when young. *Catkins leafy at base, cylindrical, lengthening in fruit. Stamens 2 to each scale of the catkin.* Scales dark but villous with long white hairs. Capsule smooth. Style short, stigma bifid. This is found on the eastern slope of the Sierra Nevada Mountains. Northward.

g. **S. fluvia′tilis (S. longifo′lia).** NARROW-LEAVED WILLOW. A shrub forming dense clumps. *Leaves linear to lanceolate, tapering at apex and base, sessile, 2–4 in. long and ¼ in. or less wide;* margin entire or with scattered teeth. *Catkins on leafy branchlets.* Stamens 2 to each scale. Capsules downy or smooth, on short pedicels, with large, sessile stigmas. Sometimes the leaves are smooth, sometimes white downy. This is widely distributed and variable.

II. POP′ULUS, Cottonwood, Poplar, Aspen

Trees with broad ovate or deltoid leaves, and buds covered with scales full of aromatic balsam. Staminate catkins appearing before the leaves, with many stamens to each scale, on a cup-shaped disk; anthers purple, staining the ground where they fall. *Fertile catkins of round or ovate pods on slender pedicels.*

a. **P. trichocar′pa Torr.** BALM OF GILEAD, BALSAM COTTONWOOD. *Leaves ovate, pointed, cordate or rounded at base, crenate, dark green above, greenish brown beneath, on terete petioles.* Buds full of balsam, and very fragrant. Tree with cracked bark and open growth. Widely distributed.

b. **P. Fremon′ti Watson.** Leaves *broadly deltoid,* with few rounded teeth on the margins, *bright green on both sides; petioles flattened.* Large tree, with gray, cracked bark. Widely distributed.

c. **P. tremuloi′des Michx.** ASPEN, QUAKING ASP. Trunk straight, slender, with smooth grayish white bark. *Leaves round-ovate, thin, on slender petioles flattened at right angles to the broad surfaces of the leaf, causing it to sway edgewise with the least perceptible breeze.* In the Sierra Nevada Mountains and far northward.

BETULA′CEÆ. BIRCH AND ALDER FAMILY

Monœcious trees or shrubs, growing along streams. Leaves toothed. Staminate catkins drooping; when young covered with resin, but without bud-scales. Stamens 2–4 in a 4-lobed or scale-like perianth under the bracts of the catkin. Pistillate flowers in short, erect cones. Pistil with a 2-celled ovary and 2 stigmas.

I. AL′NUS, Alder

Trees or shrubs with broad, toothed leaves. Staminate catkins long and drooping, appearing in early spring. Pistillate catkins erect, becoming dark brown and woody, *persisting on the trees for some time after the seeds have fallen.* Stamens generally 4 in each perianth.

a. **A. rhombifo′lia Nutt.** *Trees with dark brown bark.* Leaves ovate or oval, paler beneath, *irregularly glandular-toothed.* This blooms very early, the staminate catkins falling in January or February, and the fruit ripe at the same time. Widely distributed.

b. **A. rub′ra Bong (A. Orego′na Nutt).** *Bark pale gray, mottled with darker gray.* Leaves ovate or elliptical, rusty-pubescent on the lower surface, *doubly serrate, with revolute margins to the teeth.* Twigs smooth, winter buds glutinous, nearly ½ in. long. Catkins open in the spring before the leaves. From San Francisco to Alaska.

c. **A. tenuifo′lia Nutt.** A small tree with red-brown bark, often forming thickets. Twigs pubescent. Leaves ovate rounded or cordate at base, *doubly serrate with teeth acute,* veins prominent, winter buds short, obtuse, pubescent, about ⅓ in. long. In the Sierra Nevada Mountains and northward, especially on the eastern slope of the mountains.

II. BET′ULA, Birch

Trees or shrubs with smooth bark often coming off in sheets, dotted on the branches. Catkins similar to those of Alnus, but *the fertile ones do not persist on the trees after the seeds are ripe.* The scales and seeds fall away from the axis. Each scale of the staminate catkins bears 3 flowers, each of which consists mainly of two 2-parted filaments with an anther cell on each. On every scale of the pistillate catkins are borne 2–3 flowers, each of which consists simply of a naked ovary with 2 diverging stigmas.

B. occidenta′lis. Black Birch. A tree 20–30 ft. high with smooth dark brown or reddish bark, with conspicuous whitish horizontal lenticels, becoming lighter in color with age; the branchlets dotted with resinous spots. Leaves thin, broadly ovate, serrate with glandular teeth. Seeds with wings as broad as the body. Bracts of the catkin 3-lobed. Most common on the western side of the Rocky Mountains.

CUPULIF′ERÆ. OAK FAMILY

Monœcious trees or shrubs. Staminate flowers in catkins; pistillate forming, in fruit, a nut in a cup-like or bur-like involucre.

I. QUER′CUS, Oak

Staminate flowers in slender, fringe-like catkins, with a 6-lobed perianth; pistillate usually single, consisting of a 3-celled ovary enclosed in a bud-like involucre which becomes a cup. Stigmas 3. *Only 1 of the ovules ripens to form an acorn;* the other 5 can be seen as rudiments.

a. **Q. loba′ta Nee.** VALLEY OAK, ROBLE, WHITE OAK, WEEPING OAK. Leaves large, deciduous, deeply lobed with *obtuse divisions,* 3–4 in. long on stout petioles. Cup deep, with a rough warty surface, *acorns 1–3 in. long, usually pointed.* These trees grow to a great size, and are generally isolated in fertile valleys. They have graceful, drooping branches. Throughout California.

b. **Q. Garrya′na Dougl.** A large tree, often 10–12 ft. in circumference, with bark only 1 or, at most, 2 in. thick. *Leaves thick, strongly veined,* 4–6 in. long, 2–5 in. wide, *with coarse lobes, obtuse or acute, entire or again lobed,* dull green on the upper side, pale green or yellowish on the lower, turning brown or red in the fall. Acorns sessile or on short peduncles, with the *nut oval and obtuse,* about 1½ in. long, *in small, shallow cups.* The winter buds of this oak are nearly half an inch long and are *densely tomentose.* It is found in the valleys and hills north of San Francisco Bay and extends to British Columbia. It is common in Oregon and Washington.

c. **Q. Douglas′ii Hook. & Arn.** BLUE OAK, WHITE OAK. Leaves an inch or two long, deciduous, oblong, with shallow lobes, *bluish green, veiny. Cup usually shallow, with flat scales;* acorns oblong, often swollen in the middle. *Bark usually light gray,* causing the trunks to be very noticeable on hillsides. From Tehachapi to the Sacramento Valley.

d. **Q. oblongifo′lia Torr.** EVERGREEN LIVE OAK or WHITE OAK of southern California. *Leaves evergreen, oblong, often entire,* or with a few blunt teeth, thick, with *the veining almost concealed.* Cup with warty surface, acorns oblong. Not found north of Tehachapi.

e. **Q. chrysol´epis Liebm.** DROOPING LIVE OAK, GOLDEN CUP OAK. Leaves evergreen, oblong, entire or spinosely toothed, often both kinds on the same branch, *dark green on the upper surface, covered with a golden powder on the lower surface of young leaves; the old leaves becoming smooth and paler beneath.* Cup either bowl or saucer shaped, more or less covered with yellow powder, sometimes so dense as to conceal the scales of the cup. Acorns large and thick. This is a shrub or an immense tree growing usually in cañons. It is extremely variable in leaves and fruit. Throughout California.

f. **Q. agrifo´lia Nee.** LIVE OAK, ENCINO. Leaves evergreen, *spiny-toothed on the margin, which is curled under. Pubescence stellate.* Staminate flowers very numerous. Cup bowl-shaped, glossy, of flat scales; acorns slender, tapering, maturing in one year. This is a round, compact tree, or it sprawls over the ground with low branches, widely spreading. This never grows far from the sea, but keeps within the fog-line.

g. **Q. Wislize´ni A. DC.** POST OAK, LIVE OAK. Leaves evergreen, dark, glossy, spiny-toothed, *but not curled back, very stiff, smooth on both sides when old. Acorns maturing in 2 years.* Cup deep, very rough-scaly. Acorns variable, often almost covered by the cup. This is usually a tree, but is often shrubby and is found throughout California.

h. **Q. Califor´nica Cooper** (**Q. Kelloggii**). KELLOGG'S OAK, BLACK OAK. Leaves deciduous, large, *deeply lobed with pointed divisions, smooth and glossy green when old.* Fruit on short stems. Cups deep with smooth scales; acorns large, oblong, obtuse. Bark black and rough. The young shoots are rose-color and densely tomentose. Through the mountains of California.

i. **Q. densiflo´ra Hook & Arn.** CHESTNUT OAK, TANBARK OAK. *Leaves evergreen, oblong, ribbed with thick veins, toothed, covered more or less with white tomentum.* Cups saucer-shaped, densely covered with long, linear, curved scales that give the cup a *bristly appearance;* acorns large, with a thick shell. This is in flower and fruit at the same time, generally blooms in summer, and has *large panicled spikes of androgynous flowers.* From the Tehachapi Range northward.

II. CASTANOP´SIS, Western Chinquapin

Flowers androgynous in erect axillary or terminal panicled spikes. Staminate flowers with perianth 5–6-lobed, and stamens twice as many; sessile on the upper part of the spikes. Pistillate flowers below, in a scaly involucre. *Ovary 3-celled, with 2 ovules in each cell, maturing only 1–3 nuts in a roundish involucre, densely covered with brown, intricately* *branched prickles.* This blooms chiefly in the summer and fall, and is generally fruiting at the same time.

a. **C. chrysophyl´la A. DC.** GOLDEN-LEAVED CHINQUAPIN. Leaves *lanceolate, pointed,* dark green above, golden below. This is generally a shrub, but becomes a large beautiful tree in Mendocino County.

b. **C. semper´virens Dudley.** Leaves *obovate-oblong, obtuse at apex.* This is the species of the Sierra Nevada Mountains.

III. COR´YLUS, Hazelnut

Staminate flowers in slender, drooping catkins, each flower consisting of 8 stamens with 1-celled anthers. Pistillate flowers several, grouped in a scaly bud, each consisting of a single ovary in the axil of a bract, and with a smaller bract on each side. Ovary 2-celled, 2-ovuled (one seed only maturing). Stigmas 2, bright red, long and slender. *Nut roundish, enclosed in a fringed cup.*

C. rostra´ta Ait. var. Califor´nica A. DC. Shrubby. Leaves slightly heart-shaped. Staminate flowers drooping, very numerous; conspicuous on the leafless stems of winter. Involucre completely covering the nut, and prolonged into a beak above it. This is common in the woods along the coast. It blooms very early.

ARISTOLOCHIA´CEÆ. DUTCHMAN'S PIPE FAMILY

Shrubs or perennial herbs. Leaves heart or kidney shaped, palmately veined. Perianth adnate to the 6-celled ovary, greenish brown, regular or irregular. Stamens 6–12, attached to the style, with anthers opening outwards. Styles 6, united at base.

I. AS´ARUM, Wild Ginger

Low herbs. Leaves and flowers springing from creeping rootstocks which have the odor of ginger. Leaves large, kidney-shaped, on long petioles. *Flowers erect, bell-shaped, with 3 divisions bearing long tails.* Stamens 12, almost free from the style. Capsule round. Seeds large, 2 rows in each cell.

a. **A. cauda´tum Lindl.** Flowers on slender pedicels. Divisions of the perianth with tails from 1 to 3 in. long. This grows in damp, shady places under the trees in the Coast Mountains.

b. **A. Hartwe´gi.** Flowers on stout peduncles, from a woody base. Divisions of the perianth narrowed to a linear apex. Leaves marked with lighter-colored veins, often white-veined. This grows in the higher parts of the Sierra Nevada Mountains under the trees.

II. ARISTOLO´CHIA, Dutchman's Pipe

Perianth something like a pipe in shape, inflated, soon deciduous from the inferior ovary. Anthers 6, sessile, adnate to the short style. Stigmas 3–6-lobed. Pod club-shaped.

A. Califor´nica Torr. A shrubby vine with twining stems. Flowers greenish brown with purplish brown stripes and markings, appearing before or with the leaves, in the leaf axils. Peduncles slender, with a leaf-like bract in the middle. Leaves soft, pubescent, ovate-cordate on short petioles. This climbs amid the brush, from which it is not readily distinguishable, as the colors of the flower are so similar to its surroundings, and usually there are no leaves when the flowers are in bloom.

POLYGONA´CEÆ. BUCKWHEAT FAMILY

Shrubs or herbs. Perianth small, generally corolla-like, of 3–6 distinct or united divisions. Stamens 4–9 on the perianth. Ovary a 3-sided or lens-shaped akene, generally dark brown or black. Styles 2–4.

I. ERIOG´ONUM, California Buckwheat

Flowers small, perfect, on hair-like pedicels from *bell-shaped or top-shaped involucres.* Perianth of 6 petal-like divisions, thin in texture, yellow, white, or rose-color. Stamens 9. Styles 3, generally deflexed or curled, with cap-like stigmas. Akenes 3-sided (rarely lens-shaped or winged). Leaves without sheaths or stipules, often more or less white-woolly, generally in a spreading cluster at the base of the stem. The small involucres full of flowers are variously clustered in umbels, panicles, racemes, etc.

These plants inhabit dry places. The species are very numerous, and difficult to distinguish. The majority of the species are annuals, much branched, with slender stems. The perennial species are stouter, and one, *E. fascicula'tum*, is an evergreen shrub, with small, short leaves in clusters along the stems, and the flowers in terminal cymose panicles.

II. CHORIZAN′THE, Turkish Rugging

Involucres sessile, tubular, thick in texture, 3–6-ribbed, with as many teeth or divisions, *tipped with stiff bristles.* Flowers small, 1–3, included in the involucres, often nearly sessile. Stamens generally 9. Ovary smooth and akene triangular. Low, much branched annual herbs with slender branches, very brittle when dry. The leaves are all in a cluster at the base, and the bracts are ternate and usually small. They grow in dry, sandy places, where they often cover the ground as with a veil. The species are numerous, generally local and difficult to distinguish.

III. RUMEX, Dock, Sorrel

Coarse herbs, generally perennial, with acid or bitter juice. Perianth with 3 outer divisions green, the 3 inner generally larger, reddish or yellowish green, becoming large and veiny, often *with a white grain on the back of one or all of the inner divisions,* which closely cover the 3-sided akene. Styles 3. *Stigmas with a tuft of hairs at the top.* Leaves with papery stipules sheathing the stem.

a. **R. acetosel′la L.** SORREL, SOUR GRASS. *Flowers diœcious,* small, in a narrow panicle, becoming reddish. The inner divisions of the perianth do not enlarge over the akene. *Leaves thick, hastate.* This is very common, spreading by slender rootstocks. The male plants greatly exceed the female in number. Common everywhere.

b. **R. salicifo′lius Wein.** WILLOW-LEAVED DOCK. Stems several, generally spreading and ascending or erect. Leaves light green, 3–6 in. long, lanceolate, narrowed to a short petiole. Flowers in a leafy panicle, which becomes dark red as it grows old. *Each of the inner divisions of the perianth has a large grain on the outside.* Common in moist places everywhere.

c. **R. cris′pus L.** CURLY DOCK. Leaves on long stalks with a *crisped or curled margin.* Flowers in a leafy panicle. *The grains are present on all the inner divisions of the perianth.* Common.

d. **R. pul′cher L.** *Branches widely spreading, leafy,* reddish when young, becoming brown and stiff when old. Leaves rough on the lower surface, generally lanceolate and acute. Flowers in numerous whorls at short intervals along the branches. *Perianth with the inner divisions all grain-bearing and with 4–6 stiff bristly teeth on each side.* This is an introduced weed, becoming very common.

e. **R. occidenta'lis Watson.** Tall, 3–6 ft. in height. Lowest leaves with blade often a foot long and petiole almost as long, ovate to oblong-lanceolate, with the base heart-shaped. Panicle large, almost destitute of leaves. Perianth with large reddish divisions, finely toothed near the cordate base, *without grains on the back.* This grows in wet places throughout the Pacific coast and blooms in summer.

f. **R. persicarioi'des L.** Annual, generally with many stems, low, erect, or spreading. Leaves linear-lanceolate, on short petioles. Flowers in *dense whorls at nearly all the leaf axils.* Divisions of the perianth *all bearing grains and with 2–3 long, slender, awn-like teeth on each.* This is found in wet places, generally along the edges of ponds and lakes. It is widely distributed and blooms in summer.

IV. POLYG'ONUM, Jointweed, Smartweed

Flowers perfect in axillary or panicled spikes. Perianth of 5–6 petal-like divisions, often rose-color, not enlarging in fruit. Stamens 4–9. *Styles 2–3, with cap-like stigmas. At the base of the petiole there are papery sheaths around the stem.* The species are difficult to determine. They generally grow in swampy places.

CHENOPODIA'CEÆ. PIGWEED FAMILY

Shrubs or herbs, often with fleshy stems and leaves, usually found near the ocean or in alkaline soil, often covered with white scurf. Leaves generally salty or bitterish. Flowers perfect, monœcious or diœcious. Perianth small, of 5 greenish sepals. Stamens as many as the sepals, and opposite them. Ovary 1-celled, with the embryo coiled in a ring or spiral around the endosperm.

I. CHENOPO'DIUM

Flowers perfect in axillary or terminal clusters. *Perianth nearly covering the fruit, which is round and flattened.* Leaves alternate on petioles, often covered with scurf or down.

a. **C. al′bum L.** Lamb's-quarter, Pigweed. Annual, erect, simple or branched. *Leaves cold to the touch, covered with a flour-like powder*, from lanceolate to ovate, wavy and toothed. Flowers in spikes, either simple or panicled, and axillary or terminal. This is common in cultivated ground.

b. **C. Califor′nicum Watson.** Soap Plant. Perennial, from a spindle-shaped root. Stems smooth, usually several from the root, spreading and ascending. *Leaves triangular, 2–3 in. long, sharply and irregularly toothed.* Flowers densely clustered in long, slender, terminal spikes. Seed large, vertical, only partly covered by the 5-toothed, bell-shaped perianth. This blooms in spring, often under bushes. Near the coast, from San Diego to San Francisco Bay.

c. **C. mura′le L.** Stems generally reddish, with some flour-like powder, branching rather closely, forming a compact plant, a foot or two high. *Leaves broadly triangular to lanceolate, coarsely and deeply sinuate-toothed.* Flowers generally in *small clusters in the leaf axils, shorter than the leaves.* Sometimes the clusters are panicled at the top of the stems. Seeds black with sharp edges. Common everywhere.

d. **C. ambrosioi′des L.** Wormseed. Stems annual, stout, and branching, 2–3 ft. high. *Leaves lance-shaped, 2–5 in. long, sinuate-dentate, on short petioles.* Flowers in axillary spikes, or in panicled leafless spikes. The entire plant has a *strong, persistent, aromatic odor.* It is common in salt and alkaline marshes.

II. AT′RIPLEX, Salty Sage

Herbs or shrubs, mealy, scurfy or pubescent. Flowers in simple or panicled spikes, or clustered in the axils. Staminate flowers with the divisions of the perianth 3–5, and stamens opposite the divisions. *Pistillate flowers enclosed by 2 bracts, which are distinct or united, variously toothed, or with wart-like protuberances or winged, often thickened. Seed vertical,* generally falling with the bracts which enclose it.

a. **A. Califor′nica Moquin.** Stems many from the base, spreading on the ground a foot or more, densely mealy. *Leaves sessile, small, lanceolate, the lower opposite.* Flowers monœcious in small, axillary clusters, the staminate ones mostly near the top of the cluster. *Fruiting bracts small, round, spongy, not toothed, and without wart-like protuberances.* This is found along the coast.

b. **C. canes′cens James.** Buckwheat Sage, Salty Sage. Shrubby, diœcious. Leaves grayish green, linear or oblanceolate. Flowers in panicled spikes. *Fruiting bracts with 4 distinct dilated* *wings.* This is found in the interior, in alkaline valleys. It is a valuable forage plant.

(The species of *Atriplex* are numerous and difficult, also somewhat local, so the rest will be omitted.)

AMARANTA´CEÆ. Amaranth Family

Herbs, with small papery flowers surrounded with persistent papery bracts. Perianth persistent of from 1 to 5 papery divisions. Stamens as many as the divisions of the perianth, sometimes fewer. Ovary 1-celled and 1-seeded, forming a fruit, which opens like the lid of a box. Seed always vertical. Stigmas 2–3, sessile.

AMARAN´TUS. Amaranth

Flowers generally monœcious. Perianth of from 3 to 5 divisions. Bracts 3 to each flower. Stamens with filaments spreading at base. Stigmas generally 3, forming 3 beaks on the fruit. Seeds brown or black, dropping readily when ripe.

a. **A. retroflex´us L.** Pigweed. *Stems stout, erect.* Leaves ovate, 1–3 in. long, on petioles almost as long. Flowers green, in thick, erect, crowded spikes, either terminal or axillary. Divisions of the perianth 5. A common weed.

b. **A. al´bus L.** Tumbleweed. *Stems light green, branching diffusely from the base, forming a mound-like plant.* Leaves spatulate or obovate, often wavy-margined, on slender petioles. Divisions of the perianth 3, pointed, shorter than the fruit. Bracts awl-shaped with stiff points. This forms a tumbleweed, and will often be found caught in fences and bushes. Common everywhere.

NYCTAGINA´CEÆ. Four-o'clock Family

Herbs with fragile stems and swollen joints. Leaves opposite, entire, unequal at base. Flowers perfect, several in an involucre resembling a calyx. Perianth corolla-like, showy, the base hardening around the 1-seeded ovary.

I. MIRAB′ILIS, Four-o'clock

Involucre 5-lobed. Flowers nearly sessile. Stamens 5. Fruit scarcely ribbed. Herbs with showy, reddish purple flowers, opening in the afternoon.

a. **M. multiflo′ra Gray.** Stems often glandular; stout and spreading. Leaves broad, an inch or two long, ovate, on petioles a half-inch long. Flowers 6 in the involucre. Perianth open-funnel-form, with border an inch in diameter, and tube from 1 to 2 in. long. Southern California.

b. **M. Califor′nica Gray.** Stems several from a woody root, supported on bushes, as if climbing. Leaves ovate, cordate, on short petioles. Involucre small, 1–3-flowered. Perianth open-bell-shaped. Fruit small. This is common in southern California.

II. ABRO′NIA, Sea Verbena

Involucre of from 5 to 15 distinct papery bracts. Flowers sessile, with salver-shaped perianth, having a long tube, and the border with notched segments. Stamens 5, within the tube. Annual or perennial, fleshy herbs, with thick, opposite leaves. Flowers in umbels on long peduncles, fragrant, showy, rose-color, yellow, or white.

a. **A. umbella′ta Lam.** Stems prostrate, viscid. Leaves ovate or oblong, narrowed at base to a petiole. *Perianth rose-color. Fruit winged.* This grows on the seacoast.

b. **A. latifo′lia Esch.** Stems similar to above. Leaves broadly ovate, with kidney-shaped base. *Perianth yellow.* The flowers have the odor of orange blossoms. This is found on the coast from Vancouver to Monterey.

PORTULACA′CEÆ. Portulaca Family

Fleshy herbs. Flowers with 2 sepals (except in *Lewisia*) and 2–5 or more petals. Stamens opposite the petals when of the same number. Ovary 1-celled, style 2–8 cleft. The flowers open only in the sunshine or bright daylight.

I. PORTULA´CA, Purslane

Low herbs with alternate or opposite leaves. Flowers terminal and sessile. Petals 4–6. Stamens 7–30, inserted where the calyx joins the ovary. Pistils with 3–8 styles. *Fruit like a box opening with a lid, full of black seeds.*

P. olera´cea. PURSLANE, PUSLEY. Prostrate. Flowers small. Calyx lobes keeled. Petals yellow, spreading, notched. Common everywhere.

II. LEWIS´IA, Bitter-root

Low herbs, without stems, from thick, perpendicular roots. Leaves forming a rosette at the apex of the root. Flowers large, solitary, on low scapes, conspicuous when open, white or rose-color. Sepals 2–8. Petals 3–16. Stamens numerous. Style branches 3–8. *Pod globose, with thin walls that split from the base upwards.*

L. redivi´va. BITTER-ROOT. Leaves numerous, shorter than the scapes. Scapes jointed above the middle, bearing an involucre of 5–7 papery bracts. The flower when expanded is an inch in diameter, resembling a small cactus blossom. The sepals resemble the petals. The Bitter Root Mountains receive their name from this plant. It is the state flower of Montana.

III. CALANDRIN´IA

Sepals green and persistent. Petals and stamens usually 5, the former sometimes 3–10, the latter often indefinite. *Ovary 3-valved.* Seeds black and shining or rough, *numerous.*

a. **C. Menzie´sii Torr. & Gray.** Flowers crimson or magenta in racemes. *Petals a little longer than the sepals.* Stamens 3–10. Seeds shining. Widely distributed.

b. **C. el´egans Spach.** Stems rather stout, smooth, with ascending branches. Flowers numerous, rose-color. *Petals twice as long as the sepals.* Stamens 10–15. Usually found most abundant in cultivated ground.

IV. MON´TIA, Miner's Lettuce

Petals and stamens 5. *Pod 3-valved and 3-seeded.* Flowers white or rose-color, in racemes or panicles. When the seeds are ripe they are shot out of the pod by the elastic closing of the valves.

a. **M. perfolia´ta Howell.** Miner's Lettuce. Root leaves on long petioles, *stem leaves forming a round perfoliate leaf below the flowering stems.* Flowers small, white, often growing on but one side of the stem. This is very common and widely distributed. It grows in the shade and blooms in spring and early summer.

b. **M. Sibir´ica Howell.** Stems brittle, often climbing over other vegetation and growing in swampy places. *Leaves sessile but not united.* Flowers pink or white, a half inch in diameter, *on long pedicels, in long, loose racemes.* From Marin County to Alaska, blooming in spring and summer.

c. **M. gypsophiloi´des Howell.** Annual, pale green, with many slender stems from the root, 3–10 in. high. Root leaves linear or linear-spatulate, shorter than the stems. *Stem leaves at the base of the panicle partly united on one side. Flowers numerous, pink, sweet-scented.* This blooms in early spring and grows on rocky banks and hills. It is very variable in size and shape of leaves. In the coast mountains of central California.

d. **M. linea´ris Greene.** Annual, 6 in. to a foot high, branching. Leaves almost thread-like, fleshy, an inch or so long, becoming slightly wider toward the apex. *Flowers in racemes on one side of the stem on pedicels that recurve in fruit.* Petals white, tinged with pink, unequal, narrowed at base, separate or somewhat united. Moist places through California and northward, blooming in spring.

e. **M. Chamisso´nis Greene.** Stems erect or procumbent, *propagating by runners that have a round bulblet at the tip.* Leaves oblong-spatulate, in several pairs. *Flowers in racemes, the bracts present only with the lower flowers,* on pedicels that recurve in fruit. Petals rose-color, longer than the calyx. Seeds kidney-shaped, covered all over with tubercles. This is widely distributed and grows in wet places, blooming in spring and summer.

V. SPRA´GUEA, Pussy-paws

Sepals thin and papery. Petals 4. Stamens 3. Style with 2 lobes at the apex. Pod 2-valved. *Flowers densely clustered in umbellate spikes* curling in at the tips.

S. umbella´ta Torr. Stems several, usually from a thick root. Root leaves oblanceolate or spatulate, forming a rosette at the base, stem leaves becoming mere bracts. Flowers light rose-color. Common in the Sierra Nevada Mountains.

CARYOPHYLLA′CEÆ. Pink Family

Herbs with regular flowers, sepals as many as the petals (generally 5, the latter sometimes wanting), stamens as many or twice as many, ovary 1-celled with central placenta, styles 2–5.

I. SILE′NE, Pink

Sepals united into a 5-toothed calyx. Petals with both blade and claw, together with the 10 stamens, attached to the stipe of the ovary. *Styles 3. Capsule dehiscent from the top by 6 teeth.* Leaves opposite, without stipules. Flowers generally showy.

a. **S. Gal′lica L.** Stems generally several. Leaves hairy, spatulate. *Flowers small, on short pedicels in one-sided racemes.* Petals pale rose-color, not much longer than the sepals. This is a common introduced weed.

b. **S. Califor′nica Durand.** Low, glandular herbs, with lax, leafy stems, generally branching above. Flowers few, nearly an inch in diameter, on short pedicels, the lowest of which are deflexed in fruit. *Petals 5, bright scarlet, the blades cut into 2 divisions, which are generally toothed.* Widely distributed in shady places where the ground does not become very dry.

c. **S. lacinia′ta Cav.** Stems ascending, 1–2 ft. high. Leaves narrow, 2–3 in. long. Flowers few on the long branches. *Blades of the petals 4-cleft into linear lobes, scarlet, smaller than the preceding.* Pedicels not deflexed in fruit. This is common in southern California.

d. **S. verecun′da Watson.** Stems several from the rootstocks, branching, leafy, glandular-viscid, especially on the upper part. Leaves lanceolate, spatulate or linear. Flowers 1–3 at the ends of short branchlets. *Petals with blades shorter than the claws, rose-color: blades 2-cleft* and with the appendages in the throat oblong, entire or toothed. This is common in San Francisco near the cemeteries. It is widely distributed in California.

II. CERAS′TIUM, Mouse-ear Chickweed

Sepals separate. Petals 5, white, notched. Stamens 10. *Stigmas 5.* Capsule dehiscent from the top by 10 teeth.

a. **C. arven′se L.** Perennial, with spreading stems. Leaves linear-lanceolate, clasping the stem. *Flowers ½ in. in diameter, on long pedicels, in few-flowered cymes.* Capsule extending but little beyond the calyx. Common around San Francisco and northward.

b. **C. visco′sum L.** Annual, somewhat clammy, branched from the base. Leaves small, generally ovate. Flowers on short pedicels in rather close cymes. *Petals shorter than the calyx. Capsule nearly straight, much longer than the calyx.* The flowers open only in sunshine. This is an introduced weed.

III. STELLA′RIA, Chickweed

This is similar to *Cerastium*, but the *petals are 2-lobed*, and the capsule is globose, dehiscent to below the middle.

a. **S. me′dia L.** CHICKWEED. Annual, spreading and rooting at the lower joints. Leaves ovate, petioled. *Flowers small, on slender pedicels, which are deflexed in fruit, in the axils of leafy bracts.* Stamens 3–10. Pod equaling or surpassing the calyx. This is introduced, and is very common in shady, damp places.

b. **S. ni′tens Nutt.** Annual, low, with slender, shining stems. Flowers small, erect, on short pedicels. *Sepals shining, 3-nerved, twice as long as the petals, which are sometimes wanting.* Pod shorter than the calyx. This is a delicate little plant, with inconspicuous flowers blooming in early spring and soon disappearing.

c. **S. cris′pa Ch. & Schl.** Smooth, with long, weak, trailing stems. *Leaves thin, ovate, about an inch long, with crisped margins.* Flowers axillary, on slender pedicels. Sepals lanceolate, 3-nerved. Petals small, or wanting, white. Capsule when ripe longer than the sepals. Northern California to Alaska, growing in wet, shady places and blooming in spring and summer.

d. **S. borea′lis Bigel.** Generally smooth and erect, 6–10 in. in height. *Leaves lanceolate, narrowed to a long point, ½–1½ in. long, with one prominent nerve.* Pedicels often deflexed, scattered. Sepals ovate-lanceolate with papery margins, acute or obtuse. Petals shorter than sepals or wanting. Pods narrow, acute, nearly twice as long as the sepals. Seeds smooth. Northern California to Washington. Blooming in summer.

IV. ARENA′RIA, Sandwort

Sepals separate. *Petals 5, white, entire or notched.* Stamens 10. *Styles 3. Pod splitting into 3 valves, each with 2 parts.*

a. **A. Douglas′ii Torr. & Gray.** Slender, low, much-branched annuals. Leaves very narrow, thread-like. Flowers $\frac{1}{4}$ in. in diameter, on long, slender pedicels. Pod globose, equaling the calyx. *Seeds flat, smooth.* Throughout California.

b. **A. Califor′nica Brewer.** Similar to the preceding, but with lanceolate, very short, obtuse leaves, flowers half as large, capsule oblong, *seeds small and rough, with minute points.* Throughout California.

V. SPER′GULA, Corn Spurry

Sepals separate. Petals 5, entire. Stamens 10. *Styles 5,* alternating with the sepals. *Capsule 5-valved,* with valves opposite the sepals.

S. arven′sis L. Annual, branching herbs, with fleshy, thread-like leaves in whorls. Flowers small, white, on long pedicels that become reflexed. Sepals as long as the petals and a little shorter than the capsule. This is a common weed, blooming more or less throughout the year.

VI. SPERGULA′RIA (TISSA, BUDA, LEPIGONUM), Sand Spurry

Sepals separate. Petals 5. Stamens 10. Styles 3–5. *Capsule 3-valved.* Leaves usually fleshy, with papery stipules. Flowers white or rose-color. Low herbs, usually growing near the coast or on alkaline soil.

S. macrothe′ca Robinson. Perennial, much branched from the base, rather stout. Flowers white or rose-color, nearly $\frac{1}{2}$ in. in diameter, on pedicels that become nodding. Capsule slightly surpassing the calyx. Seeds smooth with a narrow wing. The large ovate stipules are quite noticeable. In salt marshes from Marin County to San Diego.

ILLECEBRA′CEÆ

This family is similar to *Caryophyllaceæ,* and is included under the latter by some botanists. It has an undivided or 2-cleft style, a 1-seeded fruit (like an akene), and the petals wanting or minute.

PENTACÆ′NA, Sand Mat

Sepals 5, hooded, terminating in a spine. Petals scale-like. Stamens 3–5 at the base of the sepals. Calyx becoming closed over the fruit.

P. polycnemoi′des Bartl. Perennial herbs, forming mats of densely flowered lax stems. Leaves very small, tipped with sharp awns that become recurved. Stipules papery, shorter than the leaves, but very noticeable. Flowers small, greenish, sessile, clustered in the axils. This grows in sandy soil and is common along the seacoast.

RANUNCULA′CEÆ, Buttercup Family

Herbs (Clematis shrubby) with a colorless, acrid juice, distasteful to animals. Parts of the flower all separate and distinct, inserted on the receptacle. Petals often wanting or peculiar in form. Stamens numerous; fruit consisting of numerous akenes (*f.* Fig. 166; *e.* Fig. 169), of several follicles (*f.* Fig. 168; *e.* Fig. 171), or sometimes of berries. Leaves without stipules, often clasping at base (*f.* Fig. 97; *e.* Fig. 70), generally much cut or divided.

I. CLEM′ATIS, Virgin's Bower

Climbing over bushes or rocks by the leafstalks of the compound, opposite leaves, or sometimes erect and not climbing. *Sepals 4, petal-like.* *Petals none or very small.* Pistils numerous, forming a round bunch of akenes with styles developing into long feathery tails.

a. **C. ligusticifo′lia Nutt.** *Flowers diœcious, in panicles.* Sepals thick, dull white, less than ½ in. long. Akenes with tails from 1–2 in. long. Widely distributed.

b. **C. lasian′tha Nutt.** *Flowers diœcious, solitary, on stout peduncles with one or two bracts.* Sepals thick, dull white, sometimes nearly an inch long. Fruit similar to above. In the Coast and Sierra Nevada Mountains.

c. **C. Douglas′ii Hook.** Bushy Clematis. *Stems erect, a foot or two high, not climbing.* Leaves once, twice, or thrice pinnately compound, with linear or lanceolate leaflets, axils woolly. Flowers perfect, usually solitary and terminal, nodding. *Sepals leathery, dark* *blue, forming a bell-shaped flower*, more than an inch long, with spreading tips. Tails to the akenes conspicuous. This is found from Oregon to British Columbia.

II. ANEMO′NE, Windflower, Anem′ony

Calyx of few or many petal-like sepals. Petals wanting. Akenes pointed or with long feathery tails. *Perennial herbs with stem leaves whorled, forming a kind of involucre some distance below the flower.*

III. THALIC′TRUM, Meadow-rue

Flowers diœcious in panicles. *Sepals 4–7, greenish. Petals none. Akenes in a head, terminated by long, naked styles.* Leaves twice or thrice palmately compound, leaflets 3-toothed or lobed, on short petioles. Generally tall, perennial herbs, often with a strong disagreeable odor. The species are difficult to determine.

IV. RANUN′CULUS, Buttercups

Sepals 5. *Petals 3–15, each with a little nectar-secreting scale or gland at the inside of the base.* Akenes in a head, numerous, usually flattish. Stem leaves alternate. Flowers generally yellow. (There are some that grow in the water with thread-like divisions to the leaves and small white flowers.)

a. **R. Califor′nicus Benth.** Stems branching from a cluster of thickened fibrous roots, erect, hairy. Root leaves of 3 leaflets with 3–7 linear divisions, or 3-lobed, with the lobes toothed. Sepals turned back. *Petals 10–15, glossy, yellow*, nearly ½ in. long. Akenes very flat, in a round head beaked with the stout, recurved styles. This is variable in size, leaves, and amount of pubescence. Throughout California.

b. **R. murica′tus L.** Stems stout, smooth, hollow. Flowers small. Akenes large with stout beaks, and *the sides covered with coarse prickles.* This grows in wet places and has been introduced.

c. **R. glaber′rimus Hook.** Perennial, with fleshy fibrous roots. Stems 3–6 in. high. *Root-leaves spatulate or wedge-shaped, entire or with 2–4 blunt teeth or lobes: stem leaves 3-cleft, with narrow divisions or* *entire.* Petals obovate, nearly ½ in. long. Akenes in a globose head, generally smooth, each tipped with a short beak. In the Sierra Nevada Mountains and northward to British Columbia. It blooms in the spring.

d. **R. tenel′lus Nutt.** Perennial, a foot or two high. Stems erect, hairy, or smooth. Leaves deeply lobed, 3–5 cleft, with the divisions more or less wedge-shaped, the margin with a few sharp teeth. Petals 5, small, yellow. *Akenes in a globose head, each tipped with a coiled style.* Receptacle smooth. This is widely distributed and variable. It blooms in the spring.

e. **R. occidenta′lis Nutt.** Perennial, a foot or two high. Stems widely branching, covered with widely spreading hairs. Leaves deeply cleft into 3–5 wedge-shaped divisions, these again cut ; sometimes the leaves are compound with 3 leaflets on petioles. Upper leaves simpler and smaller. Petals 5, twice as long as the reflexed sepals. *Akenes tipped with flattened, hooked beaks on a smooth receptacle.* This is variable and widely distributed. It blooms in the spring.

f. **R. alismaefo′lius Geyer.** Perennial from thick fibrous roots. Stems in bunches, short and erect, about 6 in. high. *Leaves lance-shaped, tapering to margined petioles that widen at base;* upper leaves thickish, 2–4 in. long, nearly sessile. Corolla showy, yellow, nearly 1 in. across, with broad obovate petals. *Akenes in a globose head, smooth with a short beak.* This grows in marshy places in the Sierra Nevada Mountains and northward. It blooms in the spring.

V. AQUILE′GIA, Columbine (ALSO MISTAKENLY CALLED Honeysuckle)

Sepals 5, petal-like, all similar. *Petals 5, each consisting of a tubular or expanded border terminating in a long hollow spur projecting below the sepals.* Pistils 5, forming many-seeded follicles. Perennial herbs with leaves twice or thrice palmately compound. Flowers usually nodding at the ends of the branchlets.

a. **A. trunca′ta Fisch & Meyer.** RED COLUMBINE. Flowers red, tinged with yellow. Sepals spreading. *Petals with scarcely any border, and thick, blunt spurs.* Throughout California growing in shady, moist places.

b. **A. formo′sa Fisch.** This resembles the preceding, except that the *border of the petals is prolonged, especially on the outer side.* This is found in Oregon.

VI. DELPHIN′IUM, Larkspur

Sepals 5, petal-like, the upper one prolonged backwards at the base into a spur. Petals 4, two running into the calyx spur, the others partly covering the pistils and stamens. Flowers in racemes. Fruit of 1–5 many-seeded follicles. Some of the species are poisonous to cattle. The blue Larkspurs are the most common, but they are difficult to distinguish.

a. **D. nudicau′le Torr. & Gray.** *Flowers scarlet, few, on long pedicels.* Sepals close together, spur long. Stems almost leafless, except at base, slender and delicate. This grows on moist, shady banks in the Coast Mountains.

b. **D. cardina′le Hook.** *Flowers bright scarlet with yellow centers, in a rather dense raceme.* Stems tall and stout. This grows in the mountains of southern California.

c. **D. Califor′nicum Torr. & Gray.** *Flowers in dense racemes, bluish gray, woolly on the outside,* spur horizontal, equaling the sepals. Stems 2–8 ft. high. Lower leaves 4–7 in. in diameter, deeply cleft, with wedge-shaped divisions. This generally grows on dry hills amid the brush along the coast.

VII. ACONI′TUM, Aconite, Monkshood

Sepals 5, petal-like, the upper one like a hood or helmet. The two upper petals have long claws and spur-like blades concealed within the hood; the 3 lower are much smaller or wanting. Fruit of 3–5 many-seeded follicles.

A. Columbia′num Nutt. Stems simple, leafy, 2–5 ft. high. Flowers in a loose raceme. Leaves palmately 3–5 cleft, with wedge-shaped, toothed, or cleft divisions. This is found at higher elevations in the Sierra Nevada Mountains in moist, shady places. In the northern part of the state it is found at much lower altitudes.

VIII. ACTÆ′A, Baneberry

Perennial from short, branched rootstocks, about a foot or two in height. Leaves 1 or 2, with broad triangular outline, 3–5 times compound; the leaflets ovate, irregularly cut and with the teeth on the margins unequal. *Flowers white, small, in a corymb lengthening to a raceme and terminating the stem,* blooming in spring. *Fruit consisting of red or white berries on spreading pedicels.*

A. spica′ta L. var. argu′ta Torr. Berries generally bright red, oblong or roundish, not quite so large as green peas, falling off soon when ripe. This grows in shady woods and the fruit ripens in late summer. It is considered poisonous. Widely distributed, on the coast and in the mountains.

IX. PÆO′NIA, Pæony

Stems several, from fleshy roots, erect at first, bending over in fruit. Leaves thrice-compound, leaflets cut into several segments. Flowers solitary at the ends of the stems. *Sepals 5. Petals 5, concave, brownish red.* Stamens many on a disk. *Fruit of 2–5 leathery follicles containing several large seeds.*

a. **P. Califor′nica Nutt.** *Leaves of pedate outline,* scarcely glaucous. Southern California.

b. **P. Brow′nii Dougl.** *Leaves cordate-ovate in outline,* very glaucous. From the higher Sierra Nevada Mountains to Oregon.

BERBERIDA′CEÆ. BARBERRY FAMILY

Herbs or shrubs with pinnately compound leaves; bracts, sepals, petals, and stamens opposite each other instead of alternating. Anthers opening by little valves hinged at the top. Pistil simple.

I. BER′BERIS, Barberry, Oregon Grape

Flowers yellow, in clustered racemes with bracts. Sepals 6, petal-like. Petals and stamens 6. *Leaves odd-pinnate, with stiff spiny-toothed leaflets.* Fruit, in our species, a dark blue berry. Wood yellow.

a. **B. re′pens Lindl.** OREGON GRAPE. *Less than a foot high,* from slender woody rootstocks. *Leaflets 3–7, not shining,* somewhat glaucous, racemes few, terminal. Northern California to Alaska.

b. **B. aquifo′lium Pursh.** *Often 5 or 6 ft. high: leaflets 7–9, bright green and glossy,* sinuate-dentate. Racemes terminal. Fruit nearly round. In the Sierra Nevada Mountains from Kern County northward.

c. **B. pinna'ta Lag.** From less than a foot to about 2 ft. high. Leaflets prominently spiny, *the lowest pair near the base of the petiole.* Racemes both axillary and terminal. Hills of the Coast Mountains.

d. **B. nervo'sa Pursh.** MAHONIA, WATER HOLLY. Stem simple, *bearing a crown of large leaves at summit, mixed with many dry, chaffy, persistent bracts.* Leaves 1–2 ft. long, *leaflets 11–17*, somewhat palmately nerved. Racemes long. In deep woods from Monterey northward.

II. ACH'LYS, Oregon Sweet Clover and Deer's-foot, Sweet-in-death

Flowers on a scape forming a spike, without sepals or petals. Stamens 9, in 3 sets, with slender filaments and short anthers. Pistil with a broad, sessile stigma and a simple ovary. Fruit dry and indehiscent, kidney-shaped, thick and rounded on the back, thin and concave on the other side, with a fleshy ridge down the center. *Leaves large, of 3 leaflets, having the odor of new-mown hay, or vanilla, when they become dry.*

A. triphyl'la DC. Leaves and flowering stems from a creeping rootstock. Leaves with stalks a foot or more long and with the leaflets broadly wedge-shaped, 3–5 in. long, palmately veined and coarsely and irregularly wavy-margined.

This is found in northern California and northward to British Columbia. It grows in shady woods and is much prized on account of the lasting and sweet perfume of the dried leaves. It blooms in spring.

LAURA'CEÆ. LAUREL FAMILY

Aromatic trees or shrubs. Perianth of 6 petal-like divisions. Stamens 9, in 3 rows, the inner with 3 glands at base alternating with tongue-shaped staminodia. Anthers opening as in *Berberidaceæ.* Ovary free, 1-celled, forming a fruit like an olive.

UMBELLULA'RIA, California Laurel or Bay

Flowers perfect in umbels which before opening are included in involucres that are soon deciduous.

U. Califor′nica Nutt. Spice Wood. A large, handsome tree (sometimes shrubby), with smooth bark. Leaves evergreen, glossy, lanceolate-oblong, on short petioles. Flowers yellow, soon falling. Fruit green at first, dark purple or yellow when ripe, about 1 in. long, solitary, or 2 or 3 in a cluster, on a stout peduncle. This grows near or not far from water. Oregon to San Diego. It blooms often in December or even in November.

PAPAVERA′CEÆ. Poppy Family

Herbs or shrubs. Parts of the flower all separate (except the sepals of *Eschscholtzia*, which are united), and distinct on a top-shaped receptacle. Sepals falling off as the petals expand in the bud. Petals twice as many as the sepals, generally 4. Stamens numerous and conspicuous. Fruit a capsule with parietal placentæ. (In *Platystemon* the seeds are imbedded in the walls of the capsule in rows, each row forming a linear necklace-like follicle.)

I. ESCHSCHOLT′ZIA, California Poppy

Annual or perennial herbs. Leaves bluish green, succulent, usually cut into fine divisions. *Sepals united into a pointed cap, often seen on the opening flower. Petals 4, orange or yellow.* Stamens numerous, with long anthers. Stigmas 2–6. Pods long and narrow, ribbed, usually dehiscent from the apex, the valves frequently remaining attached at the sides. Receptacle often surrounded with a rim.

E. Califor′nica Cham. Annual or perennial, with succulent leafy stems. Flowers with a funnel-form receptacle and a broad or narrow rim. Petals broad, yellow or orange, often the two colors in the same flower. This is the commonest species and is widely distributed.

II. DENDROME′CON, Tree Poppy

Shrubs with erect branches. Leaves alternate, lanceolate, entire, stiff. *Sepals 2, large. Petals 4, generally large, light yellow.* Stigmas 2. Pod similar to that of the preceding, except that the valves are generally dehiscent from the base.

D. rig′ida Benth. This shrub is generally found on gravelly or clayey hills, growing to a height of from 2 to 8 ft. It is conspicuous on account of its numerous large yellow flowers, which may be found at all seasons. The bark is whitish. It is widely distributed.

III. PLATYSTE′MON, Cream Cups

Low, branching herbs. Stem leaves opposite or whorled, entire. *Sepals 3–6, cream-color*, often with a yellowish spot near the base. Stamens numerous, with flat filaments. Stigmas linear, separate, *one to each of the necklace-like pods, which at first are somewhat united; but when ripe they separate and break apart between the seeds.*

P. Califor′nicus Benth. Stems branching from the base, from 6 in. to 1 ft. high. Leaves light green, hairy, broad-linear. Flowers not quite 1 in. in diameter. Pods from 6–25, forming an oblong cluster. This is common in early spring throughout California.

IV. PLATYSTIG′MA, Cream Cups

Stamens few or many, with narrow filaments. *Pod with 3 angles, splitting into 3 parts when ripe.*

a. **P. linea′re Benth.** This resembles *Platystemon*, but can be distinguished by the 3 stigmas and the 3-angled pods.

b. **P. Califor′nicum Benth. & Hook.** Stems long and slender, with branches 2-forked, smooth. *Flowers small, white.* Stamens about 12 in 2 circles. *Pod about 1 in. long, narrowly linear.* This is less common, and generally grows in the shade. Santa Barbara County to Oregon.

V. ARGEMO′NE, Prickly Poppy, Mexican Poppy, Thistle Poppy, Chicalote

Herbs with stout pale-green stems, and foliage more or less covered with spines or prickles. *Sap yellow. Leaves thistle-like.* Flowers large, white. *Sepals 3, each with a spine-like beak, forming a 3-horned bud.* Petals 4–6. Stamens numerous, on slender filaments. Pods 1-celled, opening at the top into 3–6 parts, the *ribs remaining fastened to the united stigmas.*

A. platy′ceras Link. & Otto. Stems smooth under the dense white prickles. Flowers 3–4 in. broad. Ovary densely covered with erect prickles. Central and southern California.

VI. ROMNE′YA, Matilija (Matil′iha) Poppy

Smooth, stout, perennial herbs, several feet high, with colorless sap. Leaves alternate, pinnately cut or divided, not spiny. *Sepals 3, each with a broad wing on the back. Petals 6, large, white.* Stamens many, with filaments diminishing towards the base. *Ovary covered with bristles. Pod 7–11-celled, the sides separating from the placenta.*

a. **R. Coul′teri Harv.** This beautiful plant is native in the southern part of the state. It is now widely cultivated. The flowers are sometimes 6 in. in diameter. *The buds are smooth.* This grows in southern California and is extensively cultivated.

b. **R. trichoca′lyx Eastwood.** This is similar to the above, but the *buds are hairy* and the *stems are not so robust.* The dissected leaves are close under the flowers. This is the true Matilija poppy, since it is the species found in the cañon of that name.

VII. MECONOP′SIS, Poppy

Annual herbs with yellow sap. Leaves variously cut into linear divisions. Sepals 2. Petals red or orange. Stamens numerous. *Stigma 4–8-lobed, on a distinct, stout style.* Pod 1-celled, with the valves separating as in *Romneya.*

M. heterophyl′la Benth. Flaming Poppy. Smooth and slender herbs with succulent stems and pale-green leaves. Flowers on long slender peduncles, exceedingly variable, from less than 1 in. to 2 in. in diameter, with pale-red petals becoming darker and more glowing at the center. Throughout California.

FUMARIA′CEÆ. Bleeding Heart Family

Perennial herbs. Leaves compound, cut into many narrow divisions. Flowers of peculiar shape. Sepals 2, petals 4, stamens 6 in 2 sets, with the filaments of each set somewhat united, the middle anthers 2-celled, the others 1-celled. Pod 1-celled, with the valves separating from the placenta.

I. DICEN′TRA, Bleeding Heart

Sepals 2, like scales. Corolla heart-shaped, the 2 outer petals swollen at the base, and with spreading tips; the 2 inner narrow, spoon-shaped, with a crest or keel on the back, united at the tips and covering the anthers and stigma. Style slender. Stigma 2-lobed, each lobe 2-crested, and so appearing 4-lobed.

a. **D. formo′sa DC.** BLEEDING HEART. Leaves and flowering stems springing from creeping rootstocks, succulent and pale green, 1 or 2 ft. high. *Flowers rose-color, in compound racemes.* This grows in rich soil in the shade. From the Sierra Nevada Mountains to British Columbia.

b. **D. chrysan′tha Hook. & Arn.** GOLDEN EARDROPS. *Flowers golden yellow, in compound racemes.* Stems leafy, stout, 2–4 ft. high. Leaves twice pinnately compounded, often more than 1 ft. long. Sepals soon falling. Flowers more than ½ in. long. This showy plant grows in sunny places, usually on dry hills, throughout California. It is not common.

CRUCIF′ERÆ. MUSTARD FAMILY

Herbs with pungent, watery juice. Leaves alternate without stipules. Flowers in racemes, spikes, or corymbs. Sepals usually 4, often falling early. Petals 4, with the blades in the form of a cross. Stamens 6, the 2 outer ones shorter than the 2 inner. Fruit a pod divided into 2 parts (except in the first 2 genera) by a transparent partition which stretches from one placenta to the other. The flowers of this family are so alike that genera and species cannot be determined without examining tolerably mature fruit.

**Pod not elongated, flowers usually very small.*

I. THYSANOCAR′PUS, Lace Pod

Flowers inconspicuous, white. *Fruit roundish, indehiscent, 1-seeded, surrounded by a prominent wing, which is crenate, filled with small, regular holes like embroidery, or with lines* *radiating from the seed to the margin.* Erect, branching, annual herbs, with leaves sessile and generally auriculate-clasping.

a. **T. cur′vipes Hook.** This is the commonest species. It has the fruit with crenate margin, often perforated. Widely distributed.

b. **T. ra′dians Benth.** This has much larger fruit than the preceding, with lines radiating from the center to the outside of the wing. This is found from California to Oregon.

II. ATHY′SANUS

Flowers very small. *Fruit roundish, not winged, generally covered with hooked prickles, indehiscent and 1-seeded.* Low, spreading, slender, delicate, hairy herbs, fruiting in spring.

A. pusil′lus Greene. This is the only species. It is widely distributed.

III. LEPID′IUM, Peppergrass

Flowers small, white or greenish, with petals often wanting. *Fruit roundish, usually notched at the apex, 2-celled, flattened contrary to the partition.*

a. **L. nit′idum Nutt.** Low annuals. *Pods shining, reddish, very numerous.* Leaves compound, with narrow, linear leaflets. This is one of the earliest plants of spring. Widely distributed.

b. **L. bipinnatif′idum Desv.** Low, almost prostrate herbs, with the lowest leaves twice divided, and divisions usually roundish. Petals wanting. *Pods round, on stout spreading pedicels.* Introduced. Common on roads and streets.

c. **L. apet′alum Willd.** Stems slender, a foot or so high, branching. Lower leaves toothed or more deeply divided, acute at apex. Flowers without petals, on erect pedicels that spread widely in fruit. *Pods smooth, round, notched at apex.* This is a weed which has been introduced and is now widely distributed.

IV. SENEBIE′RA, Wart Cress

Flowers greenish. *Pod of 2 globose, equal parts united, forming a twin pod.* Leaves pinnately parted. Low, spreading, introduced plants with a disagreeable odor.

S. pinnatif′ida DC. This is found along the coast, growing near flumes, drains, roads, etc.

V. CAPSEL′LA, Shepherd's Purse

Flowers small, white. *Pods elliptical or obcordate, 2-celled, flattened contrary to the partition.* Erect branching herbs with the leaves clustered at the base.

C. Bursa-pasto′ris Medic. SHEPHERD'S PURSE. This is the common dooryard weed, with obcordate pods in loose raceme.

*** Pod elongated. Flowers generally conspicuous.*

VI. RAPH′ANUS, Radish

Pod beaked, compressed between the seeds. Flowers large, orange, white or rose-purple, veined. These are coarse, hairy, erect, branching herbs with fleshy roots. Leaves cut into several divisions, the upper one much the largest.

R. sati′vus L. This is the common radish which grows wild throughout the settled parts of California. The petals are purplish, and the fruit is not strongly compressed between the seeds.

VII. BRAS′SICA, Mustard

Pod slender, terete, 2-celled, with a flattened beak. Flowers yellow. All probably introduced weeds.

a. **B. campes′tris L.** WHITE MUSTARD. Flowers in a loose raceme. *Leaves bluish green, smooth, clasping.* Pods large, spreading. This is very common and is in bloom earlier than the other species.

b. **B. ni′gra Koch.** BLACK MUSTARD. Flowers in close racemes at the ends of long stems, fragrant. Petals twice as long as the sepals. *Pods rather small, erect as if clinging to the stem. Stems often very tall.* This is common throughout California.

VIII. ERYS′IMUM, Wallflower

Pods spreading or erect, 1–5 in. long, 2–4-sided, with thick walls. Flowers fragrant, yellow or orange, at first in a corymb, which lengthens to a raceme. Petals with blade $\frac{1}{2}$ in. long. Erect rough herbs, with leaves linear or lanceolate.

a. **E. as′perum, DC.** Stems generally simple, often tall. Flowers generally orange. *Pods 4-sided.* Widely distributed and variable, especially in the color of the flowers.

b. **E. grandiflo′rum Nutt.** Stems 1 or 2 ft. high, simple or branched from the base. Flowers in a corymb, yellow, becoming paler after pollination. *Pod 2-sided, flattened contrary to the partition.* From Oregon to Los Angeles, not far from the coast. This includes many forms.

IX. NASTUR′TIUM, Cress

Pods short, oblong or linear, with thin walls. Flowers small, yellow or white. Leaves usually pinnately divided.

N. officina′le L. Water Cress. This is common in all the streams.

X. BARBARE′A, Wintercress, Yellow Rocket

Pods somewhat 4-sided, flattened parallel to the partition, about 1 in. long, spreading upwards. Seeds in 1 row in each cell. Flowers yellow, with petals twice as long as the sepals, in a short, dense raceme. *Lower leaves compound, with the terminal leaflet rounded and larger than the others;* upper leaves generally simple.

B. vulga′ris R. Br. This is the only species. It grows in damp places and blooms in early spring. Widely distributed.

XI. PLATYSPER′MUM

Flowers very small, solitary, on naked scapes. Sepals broad, erect, equaling the white, linear-spatulate petals. *Pods almost orbicular, with broadly winged, veiny seeds in 2 rows.* Leaves lyrate, with few lobes or almost none.

P. scapig′erum Hook. Scapes 1–6 in. in height in fruit. Flowers about $\frac{1}{12}$ in. long. Pod $\frac{1}{4}$–$\frac{1}{2}$ in. long, containing 8–12 seeds. This is found on the eastern slope of the Sierra Nevada Mountains from California north to Washington. It blooms in early spring.

XII. DENTA′RIA, Toothwort, Pepper-root

Pods linear, flattened parallel with the partition, walls firm without nerves, stigma short. *Seeds in 1 row, wingless. Flowers large, pale rose-color or milky white.*

D. Califor′nica Nutt. MILKMAIDS. Rootstocks bearing tubers which easily break off. Root leaves simple and round-kidney-shaped or with 3 leaflets (usually not found on the blooming plant); stem leaves with from 3 to 5 pinnate leaflets on petioles. This is one of the loveliest and most common of the early spring flowers, usually found in damp places. Widely distributed in the Coast Mountains.

XIII. CARDA′MINE

Pods linear, flat, with the seeds in 1 row, wingless. This is similar to *Dentaria, but has smaller flowers, narrower pods, and smaller seeds.* The chief differences lie in the cotyledons, which in *Cardamine* are flattened, while in *Dentaria* they are thick, unequal, and oblique.

C. oligosper′ma Nutt. Annual, slender, hairy or smooth. Leaves pinnately divided, with small 3–5 lobed or toothed divisions which are on small petioles. Flowers small, ¼ in. long, white, in few-flowered racemes, on short peduncles. Pods erect, on short stipes and containing 8–20 seeds. This grows in shady, damp places; it blooms in the spring and is widely distributed along the Pacific Coast.

XIV. AR′ABIS, Rock-cress

This is similar to the preceding, except that *the walls of the pods are nerved, roots woody, and seeds usually with a border or wing.* Flowers white or rose-color, often conspicuous.

a. **A. perfolia′ta Lam.** TOWER MUSTARD. Biennial herbs with stems bluish green, erect, 1 or 2 ft. high. Stem leaves *arrow-shaped and clasping.* Root leaves hairy, soon withering. Flowers small, white. *Pods numerous, slender, erect, parallel, and close to the stem.* Seeds generally narrowly winged. Widely distributed.

b. **A. blepharophyl′la Hook. & Arn.** Stems low, from a tuft of broadly spatulate, dark-green leaves, with long hairs on the margins. *Flowers large, fragrant, reddish purple.* Pods beaked, flat, loosely spreading. Seeds with a narrow wing, in 1 row. This is perennial and is found on rocky hills near the coast from San Francisco to Monterey.

c. **A. hirsu′ta Scop.** Biennial, hirsute especially at base, with spreading hairs which are simple or forked. Stems erect, simple or branched, 1–3 ft. high. Leaves at base oblanceolate, coarsely toothed or entire, 1–2 in. long, on winged petioles; *stem leaves cordate or auricled at base.* Flowers very small. Petals greenish white. Pods erect on slender pedicels, very narrow, 1–2 in. long; stigmas nearly sessile. Seeds with a narrow margin. This blooms in spring and is found from northern California to Alaska.

d. **A. Holboel′lii Hornem.** Biennial, clothed with fine stellate pubescence. Stems 1–several, simple or branched. Leaves at base oblanceolate, narrow, entire. Stem leaves arrow-shaped. Flowers becoming deflexed and generally growing on one side of the peduncle. Petals white or pink, $\frac{1}{4}$ in. long. *Pods flat, reflexed; stigmas sessile. Seeds in 1 row, orbicular, winged.* This blooms in the spring and is very widely distributed.

XV. STREPTAN′THUS, Jewel-flowers

Pods linear-oblong, flattened parallel with the partition, on a broad receptacle. Seeds flat, with a margin or wing. *Sepals usually bright purple or white, uniting somewhat to form a closed calyx. Petals narrow, with spreading blades.* Anthers long, arrow-shaped; filaments of the larger stamens often united into 2 pairs. The species are numerous and difficult to distinguish.

XVI. STANFOR′DIA (NAMED FOR HON. LELAND STANFORD).

Pods linear oblong, flattened contrary to the partition. Stigma 2-lobed, on well-developed pods. Otherwise similar to *Streptanthus.*

S. Califor′nica Watson. This is the only species. It is found in the southern San Joaquin Valley, where it is very abundant in some parts in early spring.

XVII. CAULAN′THUS, Wild Cabbage

Pods terete, or somewhat flattened, parallel with the partition. Flowers similar to the two preceding, except that the *petals have broad claws, and the blades are scarcely evident.* Tall herbs, often with inflated stems. The species are mostly local and not readily distinguished.

XVIII. THELYPO′DIUM

Pods slender, terete, or 4-sided, and often twisted, on a slender stipe. Flowers white or purplish. Stamens long, conspicuous, with very narrow, arrow-shaped anthers. *Sepals at first united to form a tube, afterwards spreading.*

T. lasiophyl′lum Greene. Erect, smooth below, hairy above. Leaves toothed or pinnately lobed or divided, with spreading segments. Flowers small, yellowish white. Pods slender, narrowed to the apex, deflexed on curved pedicels. (One variety has erect pods.) This is common, especially in cultivated ground.

XIX. STANLE′YA

Pods long and terete on a raised receptacle, with 1 row of seeds in each cell. Flowers bright yellow or cream-color, with long, narrow, spatulate petals with slender claws; anthers linear, spirally coiled, on long filaments.

S. pinnatif′ida Nutt. GOLDEN PRINCE'S PLUME. This is the only known Californian species. The long conspicuous stamens and the long, loosely and thickly flowered plume-like clusters of golden-yellow flowers suggested the common name to Helen Hunt Jackson. Southern California, common in arid districts.

CAPPARIDA′CEÆ. CAPER FAMILY

Herbs or shrubs with alternate palmately compound leaves of 3 leaflets. Flowers as in *Cruciferæ*, except that the stamens are all equal. Pods on long stipes, 1-celled, with 2 parietal placentæ. Many flowers have the pistil rudimentary and never produce fruit.

ISO′MERIS, Bladderpod

Shrubby, with hard, yellow wood. Leaflets as long as the petiole. Flowers in racemes with bracts, generally simple. Corolla yellow, ½ in. in diameter. Pods inflated, pear-shaped, drooping, on long slender stipes.

I. arbo′rea Nutt. This is the only species. It is found in southern California, where it is quite common.

CRASSULA′CEÆ. Stonecrop Family

Thick, fleshy herbs. Sepals, petals, stamens, and pistils all of the same number, or stamens twice that number. The pistils become follicles in fruit.

I. SE′DUM, Stonecrop

Sepals 4 or 5, united at base. Petals distinct, spreading, star-like. Flowers in cymes, generally on one side of the flowering axis, deep purple, yellow, or white. No one species is widely distributed in California.

a. **S. spathulifo′lium Hook.** Perennial. Stems spreading by runners and rooting at the rose-like bunches of fleshy leaves. Leaves glaucous, obovate or spatulate, flat, $\frac{1}{2}$–3 in. long. Flowering stems erect, capped by a *cyme of yellow flowers, which are almost sessile, and disposed to be on one side of the peduncles.* Petals twice as long as the ovate sepals, a little longer than the stamens and style. This blooms in summer. It grows on rocks that are clothed with moss and are wet during the rainy season, but later become dry. It is common from middle California to Washington.

b. **S. Orega′num Nutt.** This is similar to the above but is not glaucous. Flowers larger. *Petals pale rose-color*, narrowly lanceolate, with pointed apex, nearly twice as long as the stamens. This is found from northern California to Washington.

c. **S. pu′milum Benth.** *Annual*, slender, with stems simple or branched, 1–6 in. high. Leaves $\frac{1}{6}$ in. long, ovate-oblong. Flowers yellow, sessile, in cymes. Calyx lobes very small, triangular, acute. Petals linear, acute, exceeding the calyx, stamens, and styles. *Follicles 1-seeded, with the seed filling the cavity.* This is widely distributed in the Coast and Sierra Nevada Mountains. It blooms in summer and generally grows on northward slopes or on shady rocks.

II. COTYLE′DON (ECHEVERIA)

Calyx 5-parted. Petals united into a cylindrical corolla. Stamens 10, on the tube of the corolla. Leaves entire, thick, and fleshy, forming large clusters at the base of the flowering stem. Flowers red or yellow, in long racemes or cymes, coiled somewhat at the tip. The species are difficult to distinguish and mostly local.

SAXIFRAGA′CEÆ. Saxifrage Family

Herbs or shrubs. Leaves opposite or alternate without stipules. Calyx either free from or partially united to the ovary. Petals and stamens inserted on the calyx. Stamens not more than twice the number of calyx lobes. Carpels 2–5, partially or completely united into a compound ovary. Styles distinct. Seeds with endosperm. In the currants and gooseberries the fruit forms a berry.

I. SAXIF′RAGA, Saxifrage

Herbs with simple or palmately lobed leaves and cymose or panicled flowers. (Flowers rarely solitary.) Calyx 5-lobed, either free from the ovary or with the lower part of the tube coherent. Petals 5, entire, inserted on the calyx tube. Stamens 10. *Capsule consisting of 2 carpels united at the base, the styles soon diverging and becoming beaks on the akenes. Placenta axillary.* Leaves often in radical clusters and flowers on a scape.

S. Califor′nica Greene. Leaves few, rather thick, somewhat clothed with glandular hairs, oval to elliptical, on broad petioles; margin crenate or dentate. Scape 6–18 in. high; flowers in a loose panicle. Calyx nearly free from the ovary, with reflexed sepals. Petals oblong, white, thrice as long as the sepals. Stamens with filaments inserted under the edge of a disk which equals the summit of the ovary. Blooming in early spring and found on cool slopes throughout California.

II. BOYKIN′IA

Perennial herbs with creeping rootstocks, leafy stems, and paniculate corymbs or cymes of small white flowers. Leaves alternate, round-kidney-shaped, palmately lobed or toothed, the teeth glandular at tip; petioles with stipule-like dilations at base. *Calyx 5-lobed, with globular tube, adherent to the ovary.* Petals 5, entire. Stamens 5, with short filaments. *Pod splitting down the beaks, 2-celled.*

B. occidenta′lis T. & G. Diffusely branched, with slender stems 1 or 2 ft. high. Leaves somewhat scattered, thin, 5–7-lobed, 1–3 in.

broad; petioles with brown bristles at base. Calyx with urn-shaped tube and triangular lobes. Petals recurved in age, wedge-shaped. This grows along rocky streams from middle California to British Columbia. It blooms in the summer.

III. TELLI′MA

Perennial herbs from rootstocks or tubers. Leaves mostly radical, round-cordate, toothed or palmately divided, with petioles dilated at base. Flowers in a simple raceme. *Calyx bell-shaped or urn-shaped, with the base attached to the lower half of the ovary.* Petals 5, fringed, lobed, or entire, white or rose-color. Stamens 10. Styles 2 or 3, short, with round stigmas. *Capsule slightly beaked by the persistent styles, and opening between the beaks.*

a. **T. grandiflo′ra Dougl.** FRINGED CUPS. Stems rather stout, 1–2 ft. high, from a woody rootstock. Radical leaves 2–4 in. broad. *Flowers with inflated calyx and petals rose-color, fringed.* This grows in moist, shady places. From Santa Cruz to Alaska.

b. **T. af′finis Bolander.** Stems slender, about a foot high, from a tuber-bearing rootstock. Radical leaves round-kidney-shaped, slightly lobed; stem leaves 3-lobed to the middle, with coarsely toothed lobes. *Calyx narrowed at base, with its tube adhering to the ovary.* Petals white, the lower 3-toothed, the upper narrower, shorter, and entire. In shady places almost throughout the state.

c. **T. heterophyl′la Hook. & Arn.** Similar to the preceding in stem and general appearance. Radical leaves with 5 shallow, rounded lobes, stem leaves more deeply 3-lobed or parted. *Calyx bell-shaped, the base adhering to the ovary.* Petals 3-lobed. Common in the Coast Mountains, in shady places.

d. **T. parviflo′ra Hook.** Stems slender, about a foot in height, clothed with rough pubescence. Leaves 3–5-parted, with the divisions wedge-shaped and cleft into narrow lobes. *Calyx wedge-shaped, half adhering to the ovary.* Petals 3-cleft, with the divisions linear or oblong. Besides the bulblets on the slender rootstocks, there are generally some on the few-flowered raceme. Blooming in spring and found from northern California to British Columbia.

e. **T. tenel′la Watson.** Stems slender, 2–9 in. high, rough with glandular pubescence. Leaves similar to the preceding but smaller. *Calyx bell-shaped, with the base roundish or acute, adherent only at base.* Petals 3–7-parted into linear divisions. This also has bulblets on the rootstock and racemes. Blooming in spring and found from northern California to Washington.

IV. TOLMIE′A

Perennial herbs with slender, creeping rootstocks and sometimes runners. Leaves mostly from the root. Flowers small, in a loose raceme. *Calyx funnel-form, free from the ovary, thin and swollen at base, with unequal lobes. Petals 4–5, thread-like, recurved, persistent.* Stamens 3, inserted in the throat of the calyx; filaments short, and anthers with the 2 cells running into one. Pod oblong, with the base tapering to a short stem, *splitting between the diverging equal beaks.*

T. Menzie′sii T. & G. Stems 1–2 ft. high, hairy with stiff hairs. Leaves round, heart-shaped, crenately toothed; petioles slender; stem leaves few. Raceme nearly a foot long, flowers greenish or purplish, nearly ½ in. long, including the capsule. Blooming in spring and summer and found from northern California to Washington.

V. HEU′CHERA, Alum Root

Perennial herbs from stout rootstocks. Leaves all radical, cordate, lobed and toothed, the veins often colored red. Flowers small in a panicle. *Calyx generally campanulate, with base attached to the lower half of the ovary.* Petals 5, entire, small, soon falling. *Ovary and capsule 1-celled, with 2 parietal placentæ and 2 styles which become beaks on the capsule.*

a. **H. micran′tha Dougl.** This is the commonest species. It is conspicuous on moist, shady banks because of its beautiful red-veined leaves. *The flowers are quite small, and the panicle is loosely and numerously flowered.* Common in shady places in the Coast and the Sierra Nevada Mountains.

b. **H. cylin′drica Dougl.** Leaves all from the root, round-kidney-shaped, lobed or crenately toothed, 1–2 in. broad. *Flowers greenish, in spikes,* terminating leafless scapes, 1–2 ft. high. Calyx lobes erect, oblong, and elongated. Petals very small or wanting. Stamens and style short. Blooming in spring. Washington and Oregon.

VI. TIAREL′LA

Perennial herbs with simple or compound leaves with stipules. Flowers small, white, in a panicle or raceme. Calyx 5-parted, with valvate lobes. Petals 5, entire, with claws. Stamens 10, inserted with the petals at the base of the calyx. Anthers 2-celled. *Ovary 1-celled, of 2 valves, which soon separate and become unequal, one elongating, the other remaining short.* Seeds few at the base of the placentæ. Blooming in summer and found from northern California to British Columbia.

T. unifolia′ta Hook. Stems slender, ½–1½ ft. high. Leaves ovate-cordate, 3–5-lobed; those from the root on long petioles; stem leaves few, on short petioles. Panicle narrow. This is found in shady woods from northern California to British Columbia. It blooms in the summer.

VII. RI′BES, Currant, Gooseberry

Shrubs with alternate, palmately veined and lobed leaves. Flowers solitary or in racemes at the ends of leafy branchlets, sometimes blooming before the leaves. Calyx with tube attached to the globose ovary and extending beyond it, the border 4 or 5 cleft, usually colored. Petals erect, smaller than the calyx lobes. Stamens alternating with the petals. *Fruit a berry, smooth or prickly, containing many seeds, and generally surmounted by the withered remains of the flower.*

a. **R. specio′sum Pursh.** FUCHSIA-FLOWERED GOOSEBERRY. Tall, with prickly branches armed with 3 large thorns under each cluster of leaves. Leaves thick, small, smooth, nearly evergreen. Flowers 2–5, on a glandular-bristly peduncle, *bright red, with the parts four, almost 1 in. long, drooping. Stamens protruding from the corolla.* Berry dry, densely glandular-bristly. Common in southern California.

b. **R. divarica′tum Dougl.** GOOSEBERRY. Stems destitute of prickles except on young shoots, with 1–3 thorns under each cluster of leaves. Calyx greenish white or purple. Petals white, fan-shaped, much shorter than the filaments and 2-cleft style. *Berry dark red, smooth.* Widely distributed.

c. **R. sanguin′eum Pursh.** FLOWERING CURRANT. *Stems without prickles or thorns, usually glandular.* Racemes numerous, many-flowered, drooping. Flowers rose-color. Berries black or covered with a bloom. This is one of the earliest-blooming plants, sometimes flowering in November. The flowers appear before or with the leaves, and the whole plant is very fragrant. Some botanists consider that several species are included in this. Widely distributed.

d. **R. bracteo′sum Dougl.** Tall shrub, without prickles or thorns, smooth. Leaves sprinkled with resinous dots, 3–9 in. broad, 5–7-cleft, with pointed lobes and doubly serrate margins ; petioles long. *Racemes many-flowered, becoming 1 ft. long, with persistent bracts which are thread-like above and become leaf-like below.* Flowers greenish white. Calyx saucer-shaped. Fruit a black berry, sprinkled with resinous dots. Blooming in spring and found from northern California to Alaska.

e. **R. ce′reum Dougl.** Shrub with many short, stout branches, which are glutinous and sprinkled with resinous dots. Leaves 1 in. broad, kidney-shaped, 5-lobed, crenately toothed. Racemes with 3–5 flowers on short peduncles. Calyx white, with a greenish or pinkish cylindrical tube ½ in. long, the lobes recurved. Petals orbicular. *Fruit a scarlet berry with a sweet, resinous taste.* Blooming in the spring and found from northern California to Washington.

f. **R. lacus′tre Poir.** Low shrub with prickly stems and thorns under the leaf axils. Leaves 3–5-parted, their lobes deeply cut. Calyx saucer-shaped, petals small, stamens and style short. *Fruit a reddish berry more or less covered with prickles.* From northern California to Washington. The variety **molle** Gray is the form common in the mountains of California. This species has the fruit and the prickly stems of the gooseberry but the racemed flowers of the currant.

VIII. PHILADEL′PHUS, Mock Orange, Syringa

Shrubs with diffuse branches, several feet in height. Leaves opposite, entire or toothed, ovate or oblong, without stipules. Flowers showy, white, in paniculate cymes. *Calyx with tube adnate to the ovary almost to its top, with 4–5 divisions which are valvate in bud.* Petals 4 or 5, large, obovate, *convolute in bud.* Stamens many, with slender filaments. Styles 3–5, united at base or almost to the top. Pod 3–5-celled, splitting from the apex when ripe, each valve 2-parted. Seeds many, pendent on placentæ projecting from the axis.

a. **P. Lewis′ii Pursh.** Nearly smooth. Leaves ovate, 1–2 in. long, nearly entire. *Panicle on a naked peduncle. Styles distinct at apex only,* stigmas narrow. Blooming in spring and found in the Sierra Nevada Mountains from California to British Columbia.

b. **P. Gordonia′nus Lindl.** Almost smooth. Leaves ovate to oblong, 2–4 in. long, coarsely serrate with scattered teeth. Flowers in loose clusters with *the peduncles leafy at base. Styles distinct to the middle.* Blooming in spring, in the Coast Mountains, from northern California to Washington.

IX. WHIP′PLEA

Low shrubs, with trailing stems and branches. Leaves opposite, 3-ribbed, toothed. *Flowers in small cymes on slender, naked stems.* Calyx 5-cleft, with white divisions, the tube attached to the lower part of the ovary. Petals 5, very small. *Ovary 3–5-celled, with 1 seed in each cell. Styles as many as the cells.*

W. modes′ta Torr. This is always found in woods of the Coast Mountains, particularly in the redwoods.

CALYCANTHA′CEÆ. Sweet Shrub Family

Aromatic shrubs with opposite leaves and no stipules; sepals, petals, and stamens passing into each other, and all uniting below into a closed cup which is lined by a hollow receptacle bearing numerous simple pistils.

Calycan′thus occidenta′lis Hook. & Arn. Sweet Shrub. Sepals numerous, imbricated, their bases united in many ranks into a cup-shaped tube, the outer bract-like, the inner linear-oblong; petals similar. Flowers terminal, reddish purple, fragrant, with an odor like benzoin. This grows near streams and is more frequent in northern California.

ROSA′CEÆ. Rose Family

Herbs, shrubs, or trees with alternate stipulate leaves. Stamens numerous, inserted on the persistent calyx or on a calyx-like receptacle. Ovaries from one to several. Seeds few, without endosperm. This family contains some of our most valuable fruits, such as the apple, pear, quince, almond, peach, plum, apricot, cherry, raspberry, blackberry, and strawberry. There are three great subdivisions or suborders.

Suborder I. — AMYGDA′LEÆ

Trees or shrubs. Fruits with a fleshy exocarp enclosing a hard endocarp, called a drupe or stone fruit (*f.* Fig. 170; *e.* Fig. 180), as the plum, peach, almond, etc.

I. NUTTAL′LIA (OSMARO′NIA)

Shrubby, *diœcious.* Flowers white, in drooping racemes. *Carpels 5, usually only 1 or 2 ripening.* The stipules soon fall. The leaves when crushed have the odor of bitter almonds.

N. cerasifor′mis Torr. & Gray. OSO BERRY. Stems erect, generally growing in clumps, the male plants being much more numerous than the female. Racemes shorter than the leaves, with conspicuous bracts. Calyx broadly funnel-shaped, with a 5-toothed border. Petals 5, spatulate. Stamens 15, 10 erect in a line on the calyx, 5 below deflexed. Carpels on the disk at the base of the calyx. Fruit black-purple, with bitter pulp, furrowed slightly on the inner side. This often blooms in January in the Coast Mountains, but is much later in the Sierra Nevada. Widely distributed.

II. PRU′NUS, Plum, Cherry

Trees or shrubs. Flowers perfect, white. *Pistil only 1, forming a stone fruit.*

a. **P. demis′sa Walp.** CHOKECHERRY. Trees or shrubs with serrate leaves. *Flowers in many-flowered drooping racemes.* Fruit globose, red, or dark purple, astringent. Widely distributed.

b. **P. ilicifo′lia Walp.,** ISLAY. Tree or shrub *with glossy evergreen, spiny, holly-like leaves.* Racemes from ½ to 2 in. long. Fruit somewhat flattened, ½ in. thick, sweetish, the stone large and the pulp thin. From San Francisco to San Diego.

c. **P. emargina′ta Walp.** *Small tree* with slender, reddish twigs, which are generally smooth. Leaves obovate or oblanceolate, obtuse or acute, serrate with fine teeth, *with 2 glands near the summit of the petiole. Corymbs shorter than the leaves, with few, white flowers.* Fruit a dark red cherry, which is bitter and astringent.

d. **P. Califor′nica Greene.** *Shrub* with the branches from the root, smooth and shining. Leaves obovate to oblanceolate, obtuse, emarginate, or even acute, serrate with fine teeth and with *1 gland on the lower part of the blade. Flowers few in a short corymb.* Fruit a red cherry, which is very bitter. In the mountains throughout middle and northern California.

e. **P. subcorda′ta Benth.** Tree or shrub with thorny branches. Leaves ovate, 1 in. long, with the base wedge-shaped or heart-shaped, the margin finely and sharply serrate. *Flowers white, in few-flowered umbels.* Fruit a red plum, ¾ in. long, not palatable. This is common in the Coast Mountains of California. The variety **Kelloggii Lemmon** has yellow fruit, which is sweet and palatable. It is found in the northern Sierra Nevada Mountains.

SUBORDER II. — RO′SEÆ

Pistils few or many (sometimes only one) separate from each other and free from the persistent calyx; sometimes, as in the rose, enclosed and concealed in the hollow receptacle. Stipules united to the bottom of the petiole. Many are armed with spines or prickles, and some are valuable fruits, as the strawberry, raspberry, blackberry.

I. NEIL′LIA (PHYSOCAR′PUS), Ninebark, Bridal Wreath

Shrubs without thorns or prickles, the bark becoming shreddy. Leaves roundish, lobed and toothed, with large stipules. *Flowers in corymbs resembling umbels, on short leafy branchlets disposed along the stems.* Petals white. Calyx 5-lobed. Stamens numerous. *Pistils 1–5, becoming inflated, shining, 2-seeded pods.*

N. opulifo′lia Benth. & Hook. 3–10 ft. high, the slender stems often apparently climbing over the bushes. Pods becoming reddish when ripe. Widely distributed.

II. SPIRÆ′A, Hardhack

Similar to the above, except that the flowers are in *compound corymbs or panicles terminating the stems or branches, the pods are membranous and not inflated*, and the leaves generally without stipules. Pistils 5, becoming several-seeded follicles.

a. **S. densiflora Nutt.** A shrub with reddish bark, *leaves almost smooth.* Flowers rose-purple, in compound corymbs. In the Sierra Nevada Mountains.

b. **S. Douglas′ii Hook.** HARDHACK. A shrub with reddish brown bark, *leaves white on the lower surface*, flowers rose-purple, in panicles, stamens numerous, giving the cluster a woolly appearance. Northern California to British Columbia.

III. HOLODIS′CUS, Meadow-sweet

Generally taller and with small white flowers in spreading panicles. Stamens 20, inserted on a disk like a ring. *Pistils 5, becoming 1-seeded carpels which are dehiscent by one side or not at all.*

a. **S. ariæfo′lius.** Shrub with dark brown, smooth bark, leaves silky-whitish beneath, flowers white, turning brownish, in loosely flowered plumose panicles, somewhat drooping in flower, erect in fruit. Blooming in early summer and growing along the woods of the Coast Mountains.

b. **H. dis′color Maxim.** Shrub with short, rigid branches, clothed with gray-brown, shreddy bark. Leaves deep green and almost smooth above, clothed with white tomentum on the lower surface. Panicles erect on short, erect branches. This is found on the eastern slopes of the Sierra Nevada Mountains, and north to Oregon and Washington.

IV. CERCOCAR′PUS, Mountain Mahogany

Shrubs or small trees. Leaves simple, entire or toothed, evergreen. Flowers axillary, small. Calyx with a long tube and a saucer-shaped border. Petals absent. *Carpels included in the calyx tube, usually 1, tipped by a long, feathery style.*

a. **C. ledifo′lius Nutt.** *Leaves lanceolate with revolute margins*, thick and resinous, white-downy on the lower surface, smooth above. Flowers sessile, downy. Tail of fruit 2 or 3 in. long. Chiefly found on the eastern slope of the Sierra Nevada Mountains, north to Oregon and Washington. Spring.

b. **C. parvifo′lius Nutt.** Shrubby, though sometimes 15 or 20 ft. high. *Leaves obovate, wedge-shaped at base*, thinner than the preceding, with silky hairs above and white down beneath. Flowers on short, slender pedicels. Tail of fruit 3 or 4 in. long. Common, widely distributed, and variable. Spring.

V. PURSH′IA (KUN′ZIA), Buckbush

Low, diffusely branched shrubs. Leaves in bunches on the stem, wedge-shaped. Flowers small, at the ends of short branchlets. Calyx funnel-shaped. Petals 5, yellow, longer than the calyx lobes. Stamens many, in 1 row. *Carpels 1* *or 2, narrowed at each end, projecting from the calyx, but the style not becoming longer in fruit.*

P. tridenta′ta. Leaves 3-lobed at apex, covered with white down on the under surface. Calyx also downy. This is common in the lower mountains, especially on the eastern side of the Sierra Nevada Mountains. Late spring.

VI. ADENOS′TOMA, Chemisal, Greasewood

Evergreen shrub with linear, resinous leaves. Flowers small, white, in panicles. Calyx with a 10-ribbed tube and broad, membranous lobes. Petals 5, round. *Stamens generally from 10 to 15 in clusters between the petals. Fruit 1-seeded, included in the calyx tube.*

a. **A. fascicula′tum Hook. & Arn.** CHEMISAL, GREASEWOOD. Stems many, the slender, reddish branches covered with close clusters of *very small, heather-like leaves; stipules small, acute.* Flowers crowded, nearly sessile. This often exclusively covers acres, usually growing on dry hills.

b. **A. sparsifo′lium Torr.** YERBA DEL PASMO. Tree or shrub *with narrowly linear, scattered leaves, without stipules.* Flowers larger than the preceding, on distinct pedicels. This is found in southern California. It is very fragrant, and much used as a remedy for colds by the Indians.

VII. GE′UM, Avens.

Perennial herbs. Leaves chiefly radical, pinnately divided, with petioles sheathing the stem and stipules attached. Flowers about as large as a nickel, solitary or generally in corymbs. Calyx open-bell-shaped, valvate in bud, with bractlets between the lobes. Petals 5, purplish or yellow. *Carpels very numerous, on a dry receptacle, the style becoming long; in fruit either bent in the middle or feathery.*

a. **G. macrophyl′lum Willd.** Stems 1–3 ft. high, hairy. Leaves with the largest division at the tip. Corolla yellow, with broad lobes longer than the sepals. Receptacle of the fruit smooth. *Styles bent near the middle, the upper part falling, leaving the lower part hooked.* In the mountains. Summer.

b. **G. stric′tum Ait.** Similar to the preceding but less hairy. Receptacle of fruit downy instead of smooth. In the mountains.

c. **G. riva′le L.** Somewhat similar to the preceding in habit of growth. Calyx brownish purple. Petals purplish, broad, with a short claw. *Style bent in the middle, but the upper part feathery.* In the mountains. Summer.

d. **G. triflo′rum Pursh** (**G. cilia′tum**). About a foot high. Leaves all radical, except for a few bract-like leaves on the scapes, pinnate, with leaflets crowded and irregular in size. Flowers usually 3, on long peduncles, large, reddish purple. Calyx with bractlets longer than its lobes, equaling the petals. *Styles straight, long, and feathery.* Widely distributed. Summer.

VIII. CHAMÆBA′TIA, Mountain Misery, Tarweed

Low, evergreen, glandular-aromatic shrub. *Leaves tripinnately dissected with the ultimate segments minute;* stipules small, linear, entire. Flowers about as large as a dime, in terminal cymes. Calyx with top-shaped tube and 5-lobed border. Petals white, 5, obovate. Stamens many. *Pistil one becoming a large akene.*

C. foliolo′sa Benth. This is the only species. It covers the ground under the pines in the Sierra Nevada mountains. Its fern-like foliage, strong odor, and abundant viscidity cause it to be well known.

IX. POTENTIL′LA, Cinquefoil, Five-finger

Herbs (one species shrubby) with compound leaves, toothed leaflets, and stipules attached to the petiole. *Calyx saucer-shaped or bell-shaped, 5-cleft and with 5 smaller bractlets.* Petals 5, yellow (rarely white). *Akenes on the receptacle, which is dry and smooth or hairy.*

a. **P. Anseri′na L.** Silvery Cinquefoil. *Stems prostrate, with runners like a strawberry.* Leaves pinnately compound with from 7 to 21 leaflets (smaller ones interposed), sharply serrate and silvery white on the lower surface. Flowers yellow, nearly an inch in diameter, petals falling easily. Receptacle very woolly. This is common in wet places everywhere.

b. **P. glandulo′sa Lindl.** Erect, a foot or two high, covered with glandular hairs. Leaves pinnately compound with from 5 to 7 leaflets. *Flowers in cymes that become open and spreading in fruit.* Petals yellow or yellowish white. Stamens 25 in one row. This usually grows in rather shady places. Widely distributed.

c. **P. gra′cilis Dougl.** Stems 1–3 ft. high, clothed with woolly hairs. Leaves palmately or pinnately compound, with *7 or more deeply lobed or coarsely serrate leaflets which are white-tomentose on the lower surface.* Flowers yellow, in loose, ample cymes. Akenes 40 or more, smooth. This blooms in the spring and is widely distributed in the mountains. There are many species very difficult to distinguish.

X. FRAGA′RIA, Strawberry

Calyx 5-lobed and with 5 alternate bractlets. Petals 5, white, spreading. Stamens many in one row. *Carpels numerous, on a fleshy receptacle which becomes red when ripe, and is called the fruit.* Leaves palmately compound with 3 toothed leaflets. Low plants, sending out running stems that root and form new plants.

a. **F. Chilen′sis Ehr.** COAST STRAWBERRY. *Leaves thick, deep green, glossy above, hairy beneath.* Flowers white, an inch in diameter. The fruit is delicious, and the akenes are in depressions on the fleshy receptacle. This usually grows on sandy hills near the sea from San Francisco to Alaska.

b. **F. Califor′nica Cham. & Schl.** WOOD STRAWBERRY. *Leaves thin, light green, slightly hairy on both sides.* Flowers half an inch in diameter. Fruit small, with the akenes on the surface of the receptacle, not in depressions. This is generally found on wooded slopes of the Coast Mountains.

XI. RU′BUS, Raspberry

Calyx *persistent, 5-lobed, without bractlets.* Petals 5, generally conspicuous. Stamens numerous, *carpels numerous on a conical receptacle, each becoming a tiny, round stone fruit.* Leaves simple or compound, with stipules adnate to the petiole.

a. **R. Nutka′nus Moc.** THIMBLE-BERRY, SCOTCH CAPS. Erect shrub with large, 5-lobed leaves, which have gland-tipped hairs on the veins beneath and on the leafstalks. *Flowers white or pale rose-color, an inch or more in diameter. Fruit red, shaped like an inverted saucer, sweet and rather dry.* From middle California to Alaska.

b. **R. specta′bilis Pursh.** SALMON-BERRY. Erect shrubs with leaves generally compound with 3 leaflets, the veins and leafstalks somewhat woolly. *Flowers solitary, crimson,* less than an inch in diameter. *Fruit red or salmon-color, thimble-shaped, pleasant to the taste.* From near San Francisco to Alaska.

c. **R. vitifo′lius Cham. & Schl.** Blackberry. Stems trailing, very prickly. Leaves compound with 3–5 leaflets; the veins beneath, the leafstalks, peduncles, and sepals prickly. Flowers white, a half inch in diameter. *Fruit black when ripe, oblong, sweet.* Widely distributed.

d. **R. leucoder′mis Dougl.** Shrub with ascending and recurved stems, 3–5 ft. long, pale green, prickly. *Leaves with 3–4 leaflets, which are ovate-lanceolate, pointed and doubly serrate, pale green on the lower surface.* Flowers few. Sepals narrowed to a long point, surpassing the white petals. *Fruit black, generally covered with a bloom.* This is found from northern California to Washington.

XII. RO′SA, Wild Rose

Prickly and thorny shrubs. Leaves pinnately compound, leaflets serrate, stipules adnate to the petiole. *Receptacle globose, contracted at the throat.* Calyx of 5 divisions, without bractlets. Petals 5, rose-color. *Stamens many, near the mouth of the receptacle.*

a. **R. Califor′nica Cham. & Schl.** *Stems with stout recurred thorns.* Leaflets 2–3 pairs. Flowers in corymbs or rarely solitary. Fruit generally with a distinct neck beneath the spreading calyx lobes. This is widely spread throughout California, usually growing near streams.

b. **R. gymnocar′pa Nutt.** Redwood Rose. Slender shrub covered with numerous straight prickles. Flowers generally solitary, less than an inch in diameter. *Calyx lobes generally falling from the fruit.* Pedicels, petioles, and stipules glandular. This dainty rose grows in the shade of trees or bushes, usually under the redwoods.

Suborder III. — POMEÆ

Trees or shrubs with stipules not attached to the petiole. Carpels 2–5, enclosed in and attached to the fleshy receptacle, becoming a fruit like an apple, of which the core is the ovary, and the fleshy part the receptacle (pome). Ovules 2 in each cell.

I. AMELAN′CHIER, Service Berry, June Berry

Shrub or small tree with deciduous leaves. Flowers large, white, in racemes. *Ovary 5-celled, becoming a part of the* *berry-like calyx, each cell partially divided by a partition from the back, 1-seeded.*

A. alnifo´lia Nutt. Leaves rounded, serrate towards the apex. Petals narrowly oblong, nearly an inch in length. Fruit, when ripe, purplish, edible. Rather widely distributed and variable.

II. CRATÆ´GUS, Thorn Apple

Trees or shrubs, with thorny branches. Leaves simple, toothed or lobed. Flowers white, in corymbs. Calyx tube urn-shaped, with a 5-parted border. Corolla of 5 white, spreading petals, about half an inch long. Stamens 5–20. *Ovary 2–5-celled. Fruit containing 2 or 3 bony seeds, either separated or united.*

C. Douglas´ii Lindl. Tree 10–25 ft. high, with thorns on the stems 1 in. long. Leaves broadly ovate, 1½–3 in. long, lobed or cleft and finely serrate. Corymb with many flowers. Fruit sweet and insipid, black. This blooms in the spring and is found from northern California to Washington.

III. HETEROME´LES (PHOTIN´IA), Toyon´, Christmas Berry

Shrub with evergreen, oblong, serrate leaves and minute stipules. Flowers white in close panicles at the ends of the branchlets, fragrant with a sweet, sickening odor. *Receptacle adnate to the ovary, becoming fleshy in fruit and nearly covering the 2 carpels, which are generally 1-seeded.*

H. arbutifo´lia Rœmer. Berries scarlet with mealy pulp, slightly astringent, but edible. In bloom chiefly in July and August; in fruit in November and December. Common in the Coast Mountains.

IV. PY´RUS (MA´LUS), Pear, Apple

Trees or shrubs, with deciduous leaves which are simple or pinnately compound, serrate. Flowers in corymbs, white or pink. Calyx top-shaped with the border 5-cleft. Petals 5, spreading. Stamens 20. Styles 5, more or less united at base. *Fruit a pome, the 5 cartilaginous carpels forming the core, and the calyx tube becoming a fleshy covering.*

P. rivula′ris Dougl. Tree 15–25 ft. high. Leaves simple, ovate-lanceolate, acute or pointed, 1–3 in. long, sometimes lobed or with sharp teeth on the margins. Corymb somewhat like a raceme. Pedicels slender, 1 in. long. Petals orbicular, white, $\frac{1}{3}$ in. long. Fruit reddish or yellowish, $\frac{1}{2}$ in. long. This is found from northern California to Washington.

V. SOR′BUS, Mountain Ash, Rowan

Shrubs or trees. *Leaves large, pinnately compound, with oblong, serrate leaflets.* Flowers small, white, in terminal, compound cymes. Styles distinct, as many as the cells of the ovary. Fruit about the size of a pea, red when ripe, usually containing one seed.

S. occidenta′lis Greene. Shrub 2–6 ft. high, smooth. Leaflets 3–5 pairs. Cyme small, with few flowers. Fruit pear-shaped. This grows in the Sierra Nevada Mountains, chiefly northward.

LEGUMINO′SÆ. Pulse Family

Ovary 1-celled; fruit a legume (*f.* Fig. 271, II; *e.* Fig. 176). Leaves alternate, compound, with stipules (with a few exceptions). There are three subdivisions, of which two are well represented in California.

Suborder I. — PAPILIONACEÆ, Pea Family

Calyx of 5 sepals, more or less united, often somewhat irregular. Corolla of 5 petals, papilionaceous (*f.* Fig. 141; *e.* Fig. 119). Stamens 10, either monadelphous, diadelphous, or distinct. Seeds 1 or several, without endosperm.

I. THERMOP′SIS, Golden Pea

Herb with spreading underground stems. *Leaflets 3, palmate, with stipules almost as large.* Flowers large, *yellow*, in terminal many-flowered racemes on short pedicels with bracts. *Stamens distinct from each other.* Legumes linear, compressed.

a. **T. Califor′nica Wats.** Silky-tomentose. *Leaflets an inch or two long, obovate;* stipules ovate or lanceolate, often longer than the petioles. Pods 1–2 in. long, erect and slightly spreading, with but few seeds maturing. This is the common species in California. It grows among the hills of the Coast Mountains where the ground is wet but not marshy, and blooms in spring.

b. **T. monta′na Nutt.** Silky-hairy. *Leaflets oblong, 1–3 in. long;* stipules ovate or lanceolate. generally longer than the petioles. Pods strictly erect, 2–3 in. long. This is found in the mountains of Washington and Oregon. It blooms in the spring.

II. PICKERIN′GIA (XYLOTHER′MIA), Spiny Chaparral, Chaparral Pea, Needle Bush

A very spiny glaucous shrub with small evergreen leaves. Leaflets from 1 to 3, without stipules. *Flowers large, solitary, nearly sessile in the axils of the leaves,* of a rich crimson color. It fruits very rarely.

P. monta′na Nutt. This is the only species. It is the most difficult chaparral of all to penetrate because of its stout spines. It is found on dry hills in the Coast Mountains.

III. LUPI′NUS, Lupine, Sun Dial

Calyx generally 2-lipped. Corolla with broad standard and wings united above, enclosing the incurved, pointed keel. *Stamens monadelphous in 2 sets. In the bud one set has long anthers, the others are shorter and tipped with a yellow ball.* As the flower develops, the ball-tipped filaments grow longer and push the pollen up to the top of the keel, from which the pistil projects. *Leaves palmately compound,* with the leaflets folding at mid-day. Stipules adnate to the petiole. Flowers in terminal racemes, sometimes arranged in whorls on the peduncles. The flowers are generally blue; but white and yellow-flowered species exist, also one combining yellow and rose-color.

a. **L. Chamisso′nis Esch.** Shrubby, pale green from the close white pubescence. Leaflets 7–9, silky on both sides. Flowers somewhat whorled, blue, violet, rarely white. This is variable, and several species have been included under this name; but they are not easily defined. Throughout California.

b. **L. arbo′reus Sims.** Shrubby, 4–10 ft. high. Leaflets 7–11, generally 9. Flowers generally yellow, in whorls, fragrant. This grows on sand-hills along the coast, where it is abundant and very showy in summer.

c. **L. trunca′tus Nutt.** Annual, erect, simple or branching above, finely pubescent, becoming smoothish. *Leaflets 5–7, linear-wedge-shaped, with the apex obtuse, truncate, 3-toothed or entire.* Flowers small, deep purple, rather scattered on the elongating raceme. Pods more than an inch long. Common in southern California. Spring.

d. **L. latifo′lius Agardh.** Perennial, stout, branching, 2–4 ft. high, leafy, dark green. Leaflets 5–7, oblanceolate, 1–2 in. long. Racemes long on slender peduncles. *Flowers rarely whorled, violet-blue, turning brownish in fading.* This is a common species in shady places of the Coast Mountains. Spring.

e. **L. microcar′pus Sims.** Annual, with many spreading branches from near the base, *woolly throughout.* Leaflets 9, 1 in. long or more, narrowly obovate. Racemes containing many whorls of purplish flowers and persistent bracts. Peduncles short, stout, somewhat succulent, often horizontal, and with the whorls turned to the upper side. Flowers rather large, on short pedicels. *Pods thick, 2-seeded.* This is common throughout California.

f. **L. densiflo′rus Benth.** This is very similar to the preceding, but is stouter and more spreading, less hairy, *with the racemes on long peduncles and the flowers white or yellowish,* rarely rose-color. This also is common and widely distributed.

(There are many other species not so readily recognized from descriptions, and many of them are quite local.)

IV. TRIFO′LIUM, Clover

Low herbs with palmately compound leaves of 3 leaflets, stipules adnate to the petiole. *Flowers in close head-like clusters on axillary peduncles.* Calyx with 5, nearly equal teeth. Petals with claws attached to the tube of the filaments. Stamens usually diadelphous (9 and 1). *Legumes small, from 1 to 6 seeded, usually enclosed in the calyx.* The species are numerous and difficult.

V. MELILO′TUS, Sweet Clover

Leaves pinnately compound of 3 toothed leaflets. *Flowers small, in slender racemes.* Legumes roundish, 1 or 2 seeded.

The entire plant is very fragrant. The two species are introduced.

a. **M. Ind'ica Allioni.** Flowers yellow, common.
b. **M. al'ba Lam.** Flowers white. Less common.

VI. MEDICA'GO, Bur Clover, Alfalfa

Leaves pinnately compound, of 3 leaflets. *Flowers in small clusters or racemes in the axils of the leaves. Legumes curved or curled like a screw.* The species are introduced and are valuable as fodder.

a. **M. denticula'ta Willd.** BUR CLOVER. Annual, low, with stems spreading on the ground, smooth throughout. Flowers small, yellow. *Pod coiled, armed with a double row of prickles.* Common.

b. **M. sati'va L. Alfalfa, Lucerne.** Perennial, erect, smooth. Flowers violet in a close raceme. *Pod spirally coiled, without prickles.* Usually escaped from cultivation.

c. **M. apicula'ta Willd.** This is similar in appearance to *M. denticulata, but the pods have the margins rough with fine tubercles instead of with hooked prickles, and the whole surface veiny.* In some places this is more common than *M. denticulata.*

VII. HOSACK'IA (LOTUS)

Stamens diadelphous (9 and 1). Petals with long claws, free from the stamens. Leaves pinnately compound with from 2 to many leaflets. Flowers solitary or in umbels, sessile or on peduncles from the axils of the leaves. *Legumes linear, sessile, somewhat compressed between the seeds.*

a. **H. Purshia'na Benth.** Annual, erect or spreading loosely over the ground, with numerous slender branches, soft woolly throughout. Leaflets generally 3 on a linear rhachis. *Flowers solitary, salmon-color, axillary on slender peduncles which are longer than the leaves, with a single leaflet below the flower.* Legumes from 1 to 1½ in. long. This is common, blooming in the summer and autumn. Widely distributed.

b. **H. subpinna'ta T. & G.** Stems low, spreading or erect, smooth or woolly. *Leaflets small, 3–5, on a dilated rhachis; stipules gland-like. Flowers small, nearly or quite sessile in the leaf axils, without bracts.* Pod ½ in. or more in length with about 5 seeds. From Santa Barbara to Washington, common.

c. **H. parviflo′ra Benth.** Annual, with slender, smooth stems. Leaflets 3–5. *Flowers very small, yellow, but becoming red with age: peduncles thread-like, each with a 1–3-leaved bract.* Pods linear, contracted between the seeds; these 5–7. This is common from middle California to British Columbia. Spring.

d. **H. gra′cilis Benth.** Perennial with slender stems, generally spreading over the ground and growing in wet places. Leaflets 5–7; stipules thin. Umbels with 8–10 flowers about as long as the leaves, with a 3-leaved bract. Calyx teeth shorter than the tube. *Corolla with yellow banner, rose-red wings and keel.* Pods long and straight. This is the most beautiful species, and it is found from Monterey to Washington.

e. **H. bi′color Dougl.** Perennial with smooth, erect, rather stout stems. Leaflets 5–7, obovate or oblong; stipules papery, rather large. Peduncles longer than the leaves; umbel of 3–7 flowers, with or without a bract. *Flowers nearly sessile, yellow, or with white wings.* Calyx teeth half as long as the tube. This grows in wet ground and is found from near San Francisco to Washington.

f. **H. gla′bra Torr.** *Somewhat shrubby, with many nearly smooth, erect, or decumbent stems from the root.* Leaves few, with 3 small leaflets. *Umbels numerous, sessile along the stem, consisting of many yellow flowers that become reddish.* Legumes curved and tipped with the long style. This is common all over the state, and in bloom at all seasons. There are many other species more difficult to distinguish.

VIII. PSORA′LEA

Ill-scented herbs covered with dark, glandular dots. Leaves with 3–5 leaflets and stipules free from the petiole. *Flowers white or purplish in axillary spikes or racemes, with thin bracts that soon wither and fall. Legumes sessile, 1-seeded, indehiscent.*

a. **P. orbicula′ris Lindl.** *Stems running along the ground in swampy places, bearing leaves and spikes of flowers on petioles and peduncles a foot or more long.* Leaflets large, round. Flowers large, purple, in close, woolly spikes. Stamens diadelphous (9 and 1). Throughout California.

b. **P. macrosta′chya DC.** *Stems usually very tall, 6 ft. or even more.* Leaves ovate-lanceolate. *Peduncles much longer than the leaves.* Spikes silky-woolly, with blackish hairs on the calyx. Bracts broad. Corolla purple. *The tenth stamen almost free.* Legumes woolly. Throughout California, along streams.

c. **P. physo′des Dougl.** *Generally a foot or two high, with several stems spreading from the base.* Flowers in short, close racemes.

Calyx becoming slightly inflated in fruit. *Corolla yellowish white*, tinged with purple. Stamens monadelphous. In the Coast Mountains from Monterey County to Puget Sound.

IX. ASTRAG′ALUS, Rattleweed, Loco-weed

Herbs with odd-pinnate leaves and numerous leaflets. Flowers in racemes or spikes, on axillary peduncles. Stamens diadelphous (9 and 1). *Keel of the corolla blunt at tip. Legumes numerous, more or less 2-celled by one or both sutures projecting inwards, often inflated like a bladder so as to secure dispersion of the seed by the wind.* Several species are poisonous to cattle and sheep. Almost all are perennials. The species are numerous and too difficult for beginners.

X. VIC′IA, Vetch

Vines, with the leaves terminating in tendrils. Stipules semi-sagittate. Flowers solitary or in loose axillary racemes. *Stamens diadelphous. Stigma a round hairy ball at the tip of the slender style.* Legumes similar to those of the common pea.

a. **V. gigante′a Hook.** Perennials, stout, climbing high over the bushes. Leaflets from 10 to 15 pairs. Corollas reddish or dirty white, turning brown. *Pods becoming black when ripe, each seed encircled by its stalk.* This is common in moist places from San Francisco northward.

b. **V. America′na Muhl.** Pea Vine. Perennial, generally low. Leaflets from 4 to 8 pairs, linear, generally truncate or toothed at apex. *Flowers bluish, in few-flowered racemes.* Legumes smooth. Seeds 3–6, dark purple. Widely distributed.

XI. LATH′YRUS, Wild Pea

This is similar to *Vicia*, except that the tendrils are absent in some species, the flowers are larger, the leaflets broader, and, most important, *the style is hairy not only at the tip, but also down the inner side.*

The species are difficult to distinguish.

Suborder II. — CÆSALPIN′EÆ

Flowers more or less irregular. Corolla not truly papilionaceous, with the petal that answers to the standard folded within those on the side. Stamens 10 or fewer, distinct. Seeds sometimes with endosperm.

CER′CIS, Red-bud, Judas-tree

A small tree or shrub, blooming before the leaves appear. Leaves cordate to kidney-shaped, entire, palmately veined. *Flowers bright rose-color, in axillary clusters, numerous on the leafless stems.* Petals 5, the standard enclosed by the wings. *Pod large, flat and thin, turning purplish.*

C. occidenta′lis Torr. This is the only native species on the Pacific Coast. It is most beautiful along mountain streams throughout California, but not near the seacoast.

SUBORDER III. — MIMO′SEÆ

Flowers regular, small, and numerous in spikes or heads. Calyx and corolla of 4 or 5 divisions. Stamens as many or twice as many as the petals, or numerous, inserted on the receptacle.

ACA′CIA

Flowers small, numerous in spikes or heads. Stamens very numerous. Flowers usually yellow (rarely rose-color).

Leaves various, naturally pinnately compound, but in many Australian species reduced to a petiole flattened and broadened like a leaf (phyllodia). On young plants the gradations between the compound leaf and the simple phyllodia can often be seen.

GERANIA′CEÆ. GERANIUM FAMILY

Herbs with pungent, acid, or aromatic juice. Sepals and petals 5. Stamens 5 or 10.

The fruit consists of 5 distinct carpels around a central column, or is a 5–10-valved capsule splitting so as to shoot out the seeds.

I. GERA′NIUM, Crane's Bill

Annual or perennial herbs with large joints and palmately lobed leaves, stipules papery. Style 5-lobed at the summit.

Fruit of 5 carpels, which separate when ripe from the axis, each one with a long, beardless tail, which curls from the bottom of the axis to the summit. Most of the plants cultivated as geraniums belong to the genus *Pelargonium.*

a. **G. inci′sum Nutt.** Perennial, with branching, leafy stems, with glandular and hairy pubescence. *Flowers large*, axillary, on pedicels that are spreading or reflexed in fruit. *Petals purple, woolly on the inner surface.* Filaments woolly. *Fruit with the beak glandular.* Common in the Sierra Nevada Mountains and extending to Washington and Oregon. It blooms in spring and summer.

b. **G. Richardson′ii F. & M.** This is somewhat similar to the preceding, and like it, is perennial. The stems are taller, more slender, and weaker. The flowers are smaller, and always white, though there may be pink veins on the petals. It grows in wet places in the mountains at rather high elevations.

c. **G. Carolinia′num L.** Annual, with spreading stems, and gray, somewhat glandular pubescence. *Flowers and leaves closely clustered at the ends of branchlets, the former small, rose-color*, the latter orbicular in outline, but cut into several divisions. *Carpels covered with black hairs*, beak woolly or glandular. Common and widely distributed.

d. **G. dissec′tum L.** Greener than the preceding, and with *the leaves cut into narrower and more numerous divisions.* Stems weak, often supported on other plants, and frequently growing in wet places. Common, introduced.

II. ERO′DIUM, Alfilerilla, Filaree′

This is similar to *Geranium;* but the filaments are broader, and those opposite the petals are without anthers, *the tails of the carpels are bearded on the inner side, and when they break away from the axis they form a spiral.* The flowers are usually in umbels with an involucre of 4 bracts, and the petals are small and fall easily.

a. **E. cicuta′rium L'Her.** Red-stemmed Filaree. Leaves forming a rosette at the base of the stem, compound with many leaflets, which are cut into numerous, narrow, acute lobes; the stem leaves are small, and shorter than the peduncles. Flowers rose-purple, 4–8 in an umbel. The axis on which the carpels are arranged is from 1 to 2 in. long. This is the commonest and most valued "filaree."

b. **E. moscha′tum L'Her.** GREEN-STEMMED FILAREE. *This has a faint odor of musk.* The root leaves form a cluster, but are larger and coarser than the preceding, and erect, often a foot long. The leaflets are doubly serrate. This always has a greener and more luxuriant appearance than the preceding. Widely distributed.

c. **E. Bo′trys Bert.** Stems short, depressed. Leaves in a rosette, reddish and shining, oblong in outline with coarsely-toothed segments. Petals lilac-purple, longer than the calyx, forming a bell-shaped corolla. Carpels with beaks 2–4 in. long. This gives a reddish color to the hills along the seaboard in early spring. The long beaks of the akenes are conspicuous later. It is introduced, and likely to be found everywhere along the coast.

d. **E. macrophyl′lum H. & A.** Stems very short, glandular-hairy above. *Leaves kidney-shaped, crenate-serrate.* Petals white, as long as the sepals. This is found chiefly in clayey soil, and is widely distributed.

III. LIMNAN′THES, Meadow Foam

Smooth, succulent annuals with pungent juice. Leaves alternate, without stipules, pinnately cleft. Flowers showy, solitary, on axillary peduncles, white, yellowish, or rose-color. Petals convolute in the bud. Stamens 10. *Carpels at first fleshy, becoming hard and wrinkled, separating from the short axis.* This grows always in wet places.

a. **L. Douglas′ii R. Brown.** Stems very smooth, brittle, much branched. Peduncles 2–4 in. long. Sepals lanceolate, petals twice as long, yellow, white, or of both colors, obovate, emarginate. This beautiful plant sometimes covers large areas in wet meadows. Throughout California.

b. **L. ro′sea Hartw.** Leaves with narrow linear lobes; flowers white, turning rose-color. This is found in the great valleys of California.

c. **L. al′ba Hartw.** Short and stout, with the leaf segments broad, short, 3-lobed. Petals white, not much longer than the densely woolly sepals. Northern California.

IV. OX′ALIS, Wood Sorrel

Low herbs with acid juice, often without a stem. Leaves compound with 3 obcordate leaflets, like clover. Stamens 10, with filaments dilated and united at the base. *Capsule beaked with the short style, 5-celled with the valves remaining attached to the axis by the partitions.*

a. **O. Orega′na Nutt.** Wood Sorrel. Perennial herbs forming mats, with slender rootstocks from which arise the leaves and flowering stems. Leaflets broadly obcordate, rusty underneath. Scapes usually 1-flowered, with 2 bracts near the flower. *Petals nearly an inch long, pink, white, or rose-color with darker veins.* This is common in the redwood forests of the coast, north to Washington.

b. **O. cornicula′ta L.** Yellow Sorrel. This also often forms mats with slender prostrate stems. Leaflets deeply obcordate. *Peduncles bearing 2 or more flowers with yellow petals.* The reddish-leaved, yellow-flowered sorrel, which is a common weed in the streets and gardens, is a variety of this species.

LINA′CEÆ. Flax Family

Flowers with all parts 5, except the pistil. Sepals persistent, imbricated. Petals convolute in the bud, falling soon. Each division of the ovary contains a pair of seeds.

LI′NUM, Flax

Herbs with tough fibers in the bark. Leaves sessile, entire. Styles 2–5. Ovary globose, with as many true cells as styles, each cell partially separated into two false cells. The capsule splits through the false and true partitions, each half cell containing one seed. The species are rather local and with one exception small-flowered.

L. Lewis′ii Pursh. Perennial, with erect, leafy stems, smooth and bluish green. Leaves generally linear, an inch or less long, without stipules. Flowers azure blue, nearly an inch in diameter, in racemes or corymbs on elongating pedicels. Pod longer than the calyx, 10-celled and 10-valved, with the valves widely spreading when ripe. Common and widely distributed, blooming in spring and summer.

The introduced flax, **L. usitatis′simum L.**, is somewhat similar, but is an annual. There are many small-flowered, annual species in California, but they are difficult to distinguish and are more or less local.

POLYGALA′CEÆ. Polygala Family

Herbs or shrubs with simple, entire leaves without stipules. Flowers superficially resembling a pea blossom. Stamens united into one or two sets, adnate to the petals; anthers 1-celled, opening at the top.

POLYG′ALA

Sepals 5, two of them large and spreading like wings. Petals 3, united to each other and to the stamen tube, the middle one forming a hood. Stamens 6–8, with filaments united into a tube, split down one side. Pod notched, flattened contrary to the partition, 2-celled, with one seed in each cell.

a. **P. cornu′ta Kellogg.** Low shrub with slender stems and branches, 1–6 ft. high. Leaves oval, obtuse, on very short petioles. *Flowers greenish white tinged with rose-color*, in short racemes. Outer sepals usually finely tomentose. Petals shorter than the keel, which is tipped with *a straight beak.* Pod orbicular with the apex notched. This grows in the pine woods through the Sierra Nevada.

b. **P. Califor′nica Nutt.** Low perennial with slender, woody stems rising 2–8 ft. from creeping rootstocks. Flowers in terminal racemes. Sepals nearly smooth. *Petals purple*, with the wings longer than the keel, which has *a recurved beak. The fruit is chiefly from flowers without petals near the root.* The pod is smooth and almost orbicular. This is common in the Coast Mountains of California and extends to Oregon.

EUPHORBIA′CEÆ. Spurge Family

Herbs with milky juice which is sometimes poisonous. Leaves simple with stipules. Flowers monœcious or diœcious, naked or apetalous. Stamens 1 to many. Pistil 1, with a 3-lobed ovary and 6 styles or stigmas. Pod dehiscing with an elastic movement that scatters the seeds, leaving the axis.

I. EUPHOR′BIA, Spurge, Milkweed

Flowers monœcious, both *the staminate and the pistillate included in a cup-shaped involucre which might be mistaken for a calyx.* Staminate flowers numerous, each of a single stamen on a short, jointed pedicel with a tiny bract at base. Pistillate flowers solitary, hanging on a long pedicel from the center of the involucre. *Ovary with one ovule in each cell :*

styles 3, each with 2 stigmas. Involucre 4–5-lobed, the lobes alternating with crescent-shaped or colored and petal-like glands.

a. **E. albomargina′ta Torr. & Gray.** Stems numerous, forming a prostrate mat. *Leaves small, almost round, cordate with a narrow whitish edge.* Stipules united into a triangular, white, membranous scale. Glands of the involucre 4, brownish orange with white or rose-color, petal-like appendages with entire margins. Seeds 4-angled. This grows in southern California.

b. **E. serpyllifo′lia Pers.** Annual with prostrate or ascending stems, smooth. *Leaves with the base unequal,* oblong, 1–6½ in. long, the margins with some very fine teeth. Stipules bristle-like or ragged. Involucres generally solitary. Seeds 4-angled, somewhat pitted. The glands are small and the margins narrow, whitish, crenate. This is widely distributed and is often found along roads and railroad tracks. It blooms in summer and turns reddish towards fall.

c. **E. crenula′ta Engelm.** Annual or biennial, erect with one or several leafy stems from the root, generally branching above with 2-forked branches. Leaves about an inch long, spatulate. *Involucres with crescent-shaped glands and no petal-like appendages.* Seeds gray, covered with dark-colored pits. This blooms early and is widely spread.

II. EREMOCAR′PUS, Turkey Mullein, Yerba del Pescado

Stems branched from the base, prostrate, forming a mat. Flowers monœcious, clustered in the axils of the leaves without an involucre. *Staminate flowers with a 5 or 6 parted perianth; pistillate flowers, naked. Capsule 1-celled and 1-seeded.*

E. setig′erus Benth. Grayish green, covered with white hairs and a stellate pubescence. Leaves 3-nerved, ovate, obtuse, round at base, on long petioles. Flowers inconspicuous. This is called "turkey mullein" because turkeys are fond of the seeds. The name given by the early settlers is "yerba del pescado" because it was used by the Indians in catching fish. The effect of the leaves thrown into a fish stream is to stupefy the fish so that they can be caught by hand. Common in middle California and inclined to cover waste places. Summer and fall.

ANACARDIA′CEÆ. Poison Oak Family

Shrubs or trees with leaves alternate, without stipules, either simple or compound. Flowers small, regular. Stamens inserted on the inner margin of the disk. Ovary 1-celled, 1-ovuled. Styles often 3. Fruit a small drupe.

RHUS, Sumac, Poison Oak

Sepals and petals (4–9) generally 5. Stamens as many or twice as many. Sterile and fertile flowers often mixed in the clusters. Only the first species is poisonous.

a. **R. diversilo′ba T. & G.** Poison Oak. Stems shrubby or climbing by rootlets. *Leaves compound with 3 leaflets, which are 3-lobed and coarsely toothed or entire.* Flowers yellowish white, fragrant, in loose panicles in the axils of the leaves. Fruit a round, white, nerved, smooth berry. This is most poisonous in the spring. It generally forms thickets. The foliage turns red in the fall.

b. **R. triloba′ta Nutt.** Squaw Bush, Indian Lemonade. An aromatic shrub with numerous, spreading branches. Leaves somewhat variable, with 3 leaflets, the middle one 3-lobed and toothed, much larger than the 2 side leaflets, which are generally simple and crenate. *Flowers greenish, in short spikes, which precede the leaves. Fruit a red berry, pleasantly acid.* Seeds white and smooth. Widely distributed, but not especially common.

c. **R. integrifo′lia Benth. & Hook.** Shrub or small tree. Leaves many, evergreen, thick, oval, entire or with spiny teeth, dark green and glossy above, sometimes compound. Flowers rose-color, in clustered spikes. *Fruit covered with an acid, viscid coat; the berry about ½ in. long.* This is found in southern California near the sea.

d. **R. ova′ta Wats.** Similar to the above, but with larger, thinner leaves, which are ovate or almost heart-shaped; *fruit having the viscid coat crusted with a white powder.* This is found in the mountains of southern California.

e. **R. lauri′na Nutt.** Shrub with oblong-lanceolate, entire leaves on rather long petioles. Flowers many in a terminal panicle, small, white. *Fruit smooth, whitish, beaked by a stout style.* This grows in southern California near the coast.

Schi′nus mol′le L. Pepper Tree. This is extensively cultivated. It is an evergreen tree, with graceful, drooping branches and compound leaves, with 20 or more pairs of narrow leaflets. The flowers are small, diœcious, in large panicles, with 5 greenish petals and 10 stamens. The fruit consists of numerous pungent rose-color drupes as large as dry peas.

SAPINDA′CEÆ (including Buckeye and Maple)

Trees or shrubs with deciduous simple or compound leaves without stipules. Sepals 5, often irregular, and more or less united. Petals alternate with the sepals or wanting. Stamens more than 5. Ovary with 2 ovules in each cell, often only one maturing.

I. ÆS′CULUS, Buckeye

Leaves opposite, palmately compound, of 5–9 leaflets. Flowers white or pale rose-color, in a panicle nearly a foot long; very few are fertile, the majority being staminate. Calyx tubular. Petals 4 or 5, with long claws. Ovules 6, 2 in each cell of the ovary; but generally only one ripening, *becoming a large chestnut-like seed which is covered with the three leathery valves of the capsule.* The abortive seeds can all be seen within the capsule.

Æ. Califor′nica Nutt. This is a low-spreading tree or, rarely, a shrub. The leaves fall very early, leaving the pods hanging on long, naked peduncles. Rather widely distributed through middle California.

II. AC′ER, Maple

Trees or shrubs with deciduous *palmately lobed leaves.* Petals as many as the sepals, and inserted with the stamens on the margin of the disk. *Fruit of 2, winged carpels.*

a. **A. macrophyl′lum Pursh.** Large-leaved Maple. This grows to be a large tree with leaves from 6 in. to nearly a foot broad. *Flowers yellowish, fragrant, in drooping racemes.* Fruit densely hairy, with wings obliquely spreading. This grows along streams. From Santa Barbara to British Columbia.

b. **A. circina′tum Pursh.** Vine Maple. Shrubs or small trees with trailing stems that strike root where they touch the ground, forming thickets. *Flowers in loose, umbel-like corymbs.* Fruit smooth, with wings horizontally spreading. Northern California to British Columbia.

III. NEGUN′DO, Box Elder

A small tree, *with leaves pinnately compound with 3 leaflets.* Flowers diœcious, apetalous. Staminate flowers in umbels with very slender pedicels. Fertile flowers in drooping racemes. Fruit of 2, winged carpels with wings almost parallel.

N. Califor′nicum Torr. & Gray. This grows along streams in the Coast Mountains, but is not very abundant.

RHAMNA′CEÆ. BUCKTHORN FAMILY

Shrubs or trees with simple leaves and small flowers. Calyx valvate in the bud. Stamens opposite the petals. Ovary with from 2 to 4 cells. Stigmas with as many lobes as there are cells to the ovary. Seed solitary in each cell.

I. RHAM′NUS, Coffee Berry, Cascara Sagrada

Leaves alternate, with stipules that soon fall. Calyx tube urn-shaped with a 4 or 5 cleft margin. Petals very small or none. *Ovary a drupe containing 2 or 3 stones.*

a. **R. cro′cea Nutt.** *Leaves evergreen, almost orbicular, small, shining above, inclined to be yellow beneath, sharply toothed.* Flowers with the parts in fours. *Berries red.* Throughout California.

b. **R. Califor′nica Esch.** *Leaves evergreen,* 1–4 in. long, ½–2 in. wide, elliptical, denticulate, or nearly entire. *Fruit black-purple, 2-seeded.* Throughout California.

c. **R. Purshia′na DC.** This sometimes becomes a tree. *Leaves deciduous,* elliptical, pubescent beneath, 2–7 in. long, 1–3 in. wide. Petals cleft at the apex. *Fruit black, 3-seeded.* This is more common in northern California and extends to British Columbia.

II. CEANO′THUS, California Lilac

Trees, or more often shrubs, with small, simple leaves. Flowers small, blue or white, in cymes or panicles. Calyx bell-shaped, with colored margin. Petals with a small claw, the blade forming a hood. Ovary half immersed in the disk, style 3-cleft. *Fruit a 3-seeded capsule embraced at the base by the calyx tube, dehiscent from the junction of the 3 cells* with elasticity sufficient to scatter the hard nutlets.

a. **C. thyrsiflo´rus Esch.** BLUE-BLOSSOMS. A tall shrub or tree with small alternate leaves, 3-nerved from the base. *Flowers dense in numerous, compound racemes, often forming a thyrse, light blue, very fragrant.* This is one of the most beautiful plants when in bloom. It frequently covers places where the redwoods have been cut and burned. From Monterey County northward.

b. **C. veluti´nus Dougl.** This is a stout, diffusely branched shrub. *Leaves alternate, large, thick, resinous, and shining on the upper surface, aromatic, strongly ribbed from the base. Flowers white,* in loose clusters on short peduncles. Common in northern California and Oregon.

c. **C. integer´rimus H. & A.** Tall, erect shrub without spines. Leaves alternate, *3-nerved*, ovate, soft-hairy on both surfaces, on short petioles. *Flowers white or blue in slender panicles. Pods nearly smooth with the crests on the sides.* Through California in the mountains, to Washington. In some places it is known as red-root.

d. **C. divarica´tus Nutt.** *Tall shrub with olive or bluish-green branchlets.* Leaves alternate; ovate, 3-nerved, colored like the twigs but with the upper surface darker. *Flowers pale blue, in ample panicles.* Pods smooth, *scarcely crested.* The stems are rigid and frequently spiny. This is common in southern California.

e. **C. inca´nus T. & G.** Shrub with stiff, spiny, diffusely branched stems. Leaves alternate, large, elliptical to ovate, pale green, 1–2½ in. long. Flowers in short, dense, axillary clusters, frequently forming a thyrse. *Pod very resinous, lobed at top.* This is found in the Coast Mountains of middle California.

f. **C. cordula´tus Kellogg.** SNOW-BUSH. Low shrubs, generally with flat tops; stems with spreading branches gray or glaucous. *Leaves alternate, elliptical to orbicular*, generally obtuse at base, denticulate at apex, pale gray-green on the lower side, darker above. Flowers white, small, in numerous small clusters all over the stems. *Capsules smooth, slightly crested.* This forms thickets in the mountains of California and Oregon.

g. **C. folio´sus Parry.** Low shrub with declined or trailing branches. *Leaves alternate, small, with glandular, revolute margins.* Flowers dark blue or rarely white, in small, numerous clusters all over the stems. This blooms profusely soon after the rains and is in bloom almost continually. Common in the Coast Mountains.

h. **C. soredia´tus H. & A.** Erect shrub, becoming tree-like, with spreading, rigid branches, somewhat thorny. *Leaves alternate, elliptical, glandular on the margins, gray-green on the lower surface, darker above.* Flowers deep blue, small, in very numerous, small, oblong clusters. This is found in the Coast Mountains, and is a most beautiful sight in full bloom.

i. **C. cunea'tus Nutt.** *Widely branched with rigid branchlets. Leaves opposite, spatulate or wedge-shaped, on very short petioles, paler on the lower surface in lines.* Flowers in small umbels which are close together on the branches, white or lavender. *Pods with 3 erect horns or crests.* This is common throughout California to Oregon.

j. **C. crassifo'lius Torr.** Erect shrub with rigid branches, the young twigs clothed with white down. *Leaves opposite, thick, white-downy on the lower surface, obtuse or retuse at apex.* Flowers in numerous clusters on short peduncles, light blue or white, very densely clustered. *Capsule with 3 horn-like crests below the summit.* This is found in the Coast Mountains, especially in southern California.

k. **C. pineto'rum Coville.** Low shrubs with flat tops and many stiff, spreading branches. *Leaves opposite, thick, glossy on the upper surface, coarsely toothed.* Flowers blue or white, rather large, in many small clusters. *Capsules large, red, with large, erect horns near the apex and with crests between.* On dry hills in the Sierra Nevada and Coast Mountains.

l. **C. prostra'tus Benth.** SQUAW-CARPETS, MAHALA MATS. *Stems forming mats, rooting.* Leaves opposite, thick, with sharp teeth on the margins, spatulate or wedge-shaped. Flowers blue, rather large. *Pods large, red, with 3 large, wrinkled horns at the apex and crests between.* Common in the mountains of California and extending to Washington.

MALVA'CEÆ. MALLOW FAMILY

Herbs or shrubs with flowers generally showy. Calyx with lobes valvate in the bud, often with an outer row of bracts below, resembling another calyx. Petals 5, united at the base of the stamen tube. Stamens numerous, united into a column by their filaments, enclosing the pistils. Anthers kidney-shaped, 1-celled, except in *Fremontia.* Fruit a 3–10-celled pod or a cluster of one- to several-seeded carpels, at the base of the united styles, commonly called "cheeses."

I. LAVA'TERA, Tree Mallow

Stout shrubs, frequently planted as wind-breaks. Leaves large, evergreen, 5–7-lobed. Flowers axillary, on long peduncles. *Calyx with an outer row of 3–6 leaflets.* Carpels 1-seeded.

L. assurgentiflo′ra Kellogg. This grows to a height of several feet, and has large reddish purple flowers, veined with darker lines.

II. SIDAL′CEA, Rose Mallow

Perennial or annual herbs. Leaves round in outline, lobed or parted. Flowers rose-color, in a terminal raceme or spike. *Calyx with outer bracts wanting.* Column of stamens double. Carpels 1-seeded, indehiscent.

a. **S. malvæflo′ra Gray.** Perennial with several stems from the root 1–2 ft. high, erect or ascending, hairy. Root leaves rounded, deeply crenate; stem leaves 7-parted, with the divisions 3-lobed. Flowers in spike-like racemes, rose-color. *Carpels becoming somewhat wrinkled and veiny when ripe.* There are two kinds of flowers. Those with rudimentary anthers are smaller and generally of a deeper color; the perfect flowers are an inch or more across. The pistils ripen after the pollen is discharged. This is variable and common near the coast.

b. **S. Orega′na Gray.** Perennial. Stems solitary or few from the root, 2–6 ft. in height, branching into panicles which are stellate pubescent. Leaves chiefly at the base, orbicular in outline, 7–9-lobed, the lobes cleft. Flowers ½–1 in. long in spicate racemes. *Carpels slightly beaked, smooth.* From northern California to Oregon.

c. **S. diploscy′pha Gray.** *Annual, with hairy stems* 1–2 ft. high; branches spreading. Leaves round-kidney-shaped, the earliest crenate, the others with 5–7 lobed divisions. Petals pink, an inch long. *Carpels veiny and wrinkled, depressed, beakless.* This is common in middle California in fields, growing like a weed. It is one of the most beautiful species.

III. MALVAS′TRUM

Erect shrubs or herbs. *Calyx with 3 outer bracts.* Stamen tube simple. Stigmas capitate. *Carpels 1-seeded, usually splitting from the top.*

a. **M. Par′ryi Greene.** *Annual. Stems prostrate or ascending.* Leaves deeply 5-parted, with toothed or lobed segments. Flowers axillary, on long, slender peduncles. Carpels 15–20. This is similar to *Sidalcea malvæflora* in the diœcious character of its flowers. The perfect flowers are often more than an inch in diameter. This is found in middle California in dry places.

b. **M. fascicula'tum Greene.** *A shrub 6–8 ft. high, with long, slender branches.* Leaves tomentose, 5-lobed, coarsely toothed. Flowers in racemes or panicles. Corolla rose-purple, $\frac{3}{4}$ in. long. Carpels smooth below, tomentose above. This is a beautiful shrub, or sometimes a tree, common in southern California.

IV. FREMON'TIA, Slippery Elm

A shrub or small tree, with small 3–7-lobed leaves, rusty stellate pubescent. Calyx 1–3 in. in diameter, 5-cleft almost to the base, with bright yellow, leathery divisions, imbricated in the bud; persistent bractlets under the calyx 3–5, small. Corolla wanting. Stamens 5, with filaments united to the middle. Anthers linear, 2-celled. Capsule 4 or 5 celled, dehiscent from the top. This is, by some authorities, put into *Sterculiaceæ.*

F. Califor'nica Torr. FALSE SLIPPERY ELM. This is a fine sight when in bloom. The large yellow flowers are numerous on the long stems. The fruit is densely hairy and woolly on the inside, and the dry open pods persist. The bark is used as slippery elm. From middle California to San Diego.

HYPERICA'CEÆ, ST. JOHN'S-WORT FAMILY

Herbs with opposite leaves, covered with transparent or dark dots or with both kinds. Flowers with 4 or 5 sepals, and as many petals. Stamens numerous in 3–5 clusters, on the receptacle. Styles 3–5, more or less united. Pod splitting at the partitions into 3 valves.

HYPERI'CUM, St. John's-wort

Flowers yellow. Stamens in several sets, stigmas capitate.

a. **H. Scou'leri Hook.** *Erect, with simple stems from running rootstocks.* Leaves oblong, obtuse, clasping, about an inch long. Flowers nearly an inch in diameter, in panicled cymes. This grows in moist places, chiefly in the mountains.

b. **H. concin'num Benth.** *Stems low, numerous, from a woody base. Leaves not clasping, usually folded, growing in four distinct ranks up* *the stem.* Stamens very numerous, in 3 sets. Corollas nearly an inch in diameter. This grows on dry hills in central California.

c. **H. anagalloi′des Cham. & Schl.** *Stems weak, low, spreading, rooting at the joints, growing in wet places and forming mats.* Leaves small, clasping. *Flowers small, in cymes.* Pod 1-celled. Widely distributed.

FRANKENIA′CEÆ, YERBA REUMA FAMILY

Low, spreading, perennial herbs or shrubs, with opposite, entire leaves and no stipules. Calyx tubular, 4 or 5 lobed, ribbed. Petals with long claws inserted on the receptacle. Stamens 4–7. Ovary 1-celled. Fruit a 2–4-valved pod included in the calyx tube.

a. **Franke′nia grandiflo′ra Cham. & Schl.** YERBA REUMA. Stems very numerous, slender. Leaves numerous, small and narrow, with the margins rolled under. Petals small, pink. On account of the great amount of salt contained in this plant it is almost impossible to dry it. It is common in salt marshes on the coast.

b. **F. grandiflo′ra var. campes′tris.** This is the form found in the interior alkaline marshes.

CISTA′CEÆ, ROCKROSE FAMILY

Calyx in 2 series; the outer sepals 2, smaller than the 3 inner, turned to the left in the bud, while the 5 petals are turned to the right. Stamens many, style 1. Fruit a capsule, with the parietal placentæ protruding towards the center.

HELIAN′THEMUM, Rockrose

Perennials, with many slender stems about a foot high from a woody root. Flowers small, yellow, open only in sunshine, with petals soon falling. Ovary opening into 3 valves.

H. scopa′rium Nutt. This grows on dry hills throughout California, in the Coast Mountains.

VIOLA′CEÆ, VIOLET FAMILY

Low perennial herbs having alternate leaves with leaf-like stipules. Flowers on axillary peduncles. Sepals 5, persistent. Petals 5, one with a spur at base. Stamens 5, short, with the filaments cohering around the pistil. Style club-shaped, with a one-sided stigma. Pod 1-celled, splitting into 3 parts, each bearing seeds on the middle nerve. The seeds are often scattered by the bursting of the elastic valves.

VI′OLA, Violet

Sepals ear-like at the base. Petals somewhat bearded within, thus affording a foothold for bees, the lowest one with a spur at base. Stamens not cohering very much, the lowest with spurs which reach down into the spur of the lowest petal.

a. **V. palus′tris L.** Stemless, low, from thread-like creeping rootstocks. Leaves round-cordate, 1–2 in. in diameter, faintly crenate. *Flowers pale lilac to white, with short, rounded, sac-like spurs.* Northern California to Alaska, growing in swampy places in the mountains.

b. **V. cani′na var. adun′ca Gray.** BLUE VIOLET. Stems leafy, several from the rootstock. Leaves simple, ovate-cordate, with leaf-like stipules. *Flowers blue, with the spur as long as the sepals. The side petals are bearded.* Widely distributed in the Coast Mountains.

c. **V. ocella′ta T. & G.** HEART'S-EASE. Stems leafy. Leaves heart-shaped, crenate, with small papery stipules. *Upper petals white within, dark on the outside; the others pale yellow, veined with purple; those on the sides with a purple spot near the base.* In woods from Monterey County northward.

d. **V. peduncula′ta T. & G.** PANSY. Stems leafy, with ovate leaves wedge-shaped at the base. Stipules narrowly lance-shaped. *Flowers large, on long peduncles, deep yellow.* Upper petals tinged with brown on the outside, the others veined with purple, those on the sides bearded. Common from southern to middle California.

e. **V. sarmento′sa Dougl.** CREEPING VIOLET. *Stems creeping by leafy stolons.* Leaves finely crenate, round, with heart-shaped base. *Flowers light yellow.* This grows in the woods of the Coast Mountains.

f. **V. præmor′sa Dougl.** Stems short, frequently underground, gray pubescent or smooth. *Leaves ovate-lanceolate, with the margin sinuate to dentate, tapering to the petiole.* Sepals papery, entire or slashed. *Petals yellow, generally tinged with brown on the outside.* Ovary globular, pubescent. Variable and widely distributed.

g. **V. loba′ta Benth.** Stems leafy. *Leaves palmately cut into 5–9 narrow lobes, the central one the longest.* (The root leaves are sometimes simple with crenate margins.) Stipules large, leaf-like. *Flowers yellow.* Upper petals brownish purple on the outside, the others veined or tinged with purple, the side petals slightly bearded. Throughout California.

h. **V. chrysan′tha Hook.** Apparently stemless. *Leaves round in outline, twice divided into linear segments.* Stipules lance-shaped. Flowers on peduncles as long as or longer than the leaves, bright yellow. *Lower petals veined, yellow; the upper brownish purple on the outside;* the side petals not bearded. On low hills from Monterey County northward.

i. **V. trinerva′ta Howell.** Stemless, smooth. *Leaves palmately 3–5-parted with lanceolate, acute divisions;* stipules small, entire, almost free. *Upper petals deep blue or violet; lower yellow.* Washington.

j. **V. Beckwith′ii T. & G.** Stemless, hairy or almost smooth. Leaves orbicular, *palmately 3-parted into linear, obtuse divisions. Upper petals deep blue or violet, lower light blue or white, with the base yellowish.* This is found from northern California in the Sierra Nevada to Oregon, generally on the eastern slope.

MYRTA′CEÆ, MYRTLE FAMILY

EUCALYP′TUS. There are many different species of this genus cultivated in California. The young shoots have opposite leaves much broader than the older leaves, which are alternate. The calyx never opens. It is like a lid and falls off. Under this is another very thin lid which answers to the corolla. Then the numerous stamens rise and expand, producing a tassel-like blossom. The fruit is a 3–5-celled capsule imbedded in the receptacle and opening by chinks at the top. The commonest species in cultivation is the Blue Gum, *Eucalyptus globulus* Labill.

ONAGRA′CEÆ, EVENING PRIMROSE FAMILY

Herbs with the calyx tube inserted on the ovary. Parts of the flower 4, except the stamens, which are generally 8. Capsule 4-celled, and stigma 4-lobed or capitate. Leaves simple, without stipules. Flowers usually showy.

I. ZAUSCHNE′RIA, Wild Fuchsia

Perennial herbs with many low ascending stems from woody rootstocks. Leaves opposite, except the upper ones. *Flowers large, scarlet, in racemes. Calyx with tube globose just above the ovary, the funnel-formed border 4-lobed, with 8 scales within, 4 erect and 4 deflexed.* Petals 4, obcordate and deeply cleft, a little longer than the calyx lobes. Stamens 8 in 2 sets, one shorter than the other. Anthers versatile. Stigma 4-lobed or shield-shaped. Pod 4-angled. *Seeds with a tuft of down at the end.*

Z. Califor′nica Presl. All the forms of *Zauschneria* are considered by many botanists to belong to this species. It is extremely variable, and found through California; blooming from summer until late in the fall.

II. EPILO′BIUM, Willow Herb

Perennial herbs often growing near water. *Calyx with tube short or none, border with 4 spreading, deciduous lobes.* Petals spreading or erect, purplish or white, often notched at the apex. Stamens 8 in 2 sets, one shorter; anthers versatile. Stigma with 4 spreading lobes or somewhat club-shaped. Pod 4-sided. *Seeds with a tuft of long white hairs.*

a. **E. spica′tum Lam.** FIREWEED. Perennial, with tall, erect, simple, leafy stems. Leaves sessile, lance-shaped, entire. *Flowers reddish purple, large, in a long spike with noticeable bracts.* (The spike resembles a raceme because of the long, linear ovaries, which look like pedicels.) Style yellow, hairy at the base, with 4 linear stigma lobes. This is common in the Sierra Nevada Mountains wherever the timber has been burned, and also in the northern part of the Coast Mountains.

b. **E. panicula′tum Nutt.** *Annual, with slender stems branching widely above, low or 10 ft. high.* Leaves small, often in clusters on the main stem, almost wanting on the branches. Flowers small, rose-color, veined with darker lines, terminating the slender thread-like branches. Petals deeply notched, nearly twice as long as the calyx lobes. This is common, and blooms in the fall. Widely distributed.

c. **E. adenocau′lon Hausskn.** Stems ascending, tall, with the inflorescence branched. Leaves ovate-lanceolate, with rounded base, finely toothed margins, and short-winged petioles. Flowers small, rose-color, nodding at first. *Inflorescence and seed-pods glandular pubescent.* This is common and widely distributed. It grows near wet places. *Little rosettes of leaves appear late in the season at the base of the stem.*

III. ŒNOTHE′RA, Evening Primrose

Herbs with alternate leaves. *Flowers various, with calyx tube prolonged above the ovary, and the lobes reflexed,* often remaining somewhat united. Petals 4, white or yellow, turning reddish or, in some yellow-flowered species, greenish. Stamens 8, with anthers versatile. Stigma either with 4 linear divisions or capitate. The following are the most widely distributed species.

a. **Œ. Califor′nica Watson.** White Evening Primrose. Perennials, with low, rather stout stems covered with white, shining epidermis. *Flowers axillary, with petals white, obcordate, more than an inch long.* Style 4-cleft. Capsules 2 in. long, slightly tapering. Central and southern California.

b. **Œ. bien′nis L.** Yellow Evening Primrose. Stem erect, often 3 ft. high, leafy. *Flowers large (often more than 2 in. in diameter), yellow, in a leafy spike.* Stigmas with 4 linear lobes. This is generally found in moist places. There are several varieties, differing chiefly in the amount of pubescence and the size of the flowers. Widely distributed.

c. **Œ. gauræflo′ra T. & G.** Nodding Evening Primrose. Stems leafy, simple or branched from the base. *Flowers rather small (not ½ in. in diameter), very numerous, white, turning rose-color, in a nodding spike.* Capsules slender, linear, much contorted. This is common in the San Joaquin Valley on the sides of hills or gulches.

d. **Œ. ova′ta Nutt.** Sun Cups (incorrectly called Cowslips). *Low, with leaves and flowers from a fleshy root forming rosettes on the ground.* Leaves broadly lance-shaped, with the margins generally toothed or wavy, 3–8 in. long, often the midvein red. Calyx tube like a long stem, 1–4 in. long, extending down to the capsule, which is underground. *Corolla bright yellow, with petals ½ in. or more long.* Stigma capitate. This grows in moist places not far from the coast, and blooms early.

e. **Œ. campes′tris Greene.** *Annual, with many slender branches from the root, 6 in. to nearly a foot high.* Leaves narrow, linear, dentate. Calyx tube short, funnel-form, attached to the long linear capsule, which often becomes somewhat contorted. *Petals ½ in. or less long, bright yellow, sometimes spotted at base.* Anthers versatile, stigma capitate. This is generally many-flowered, and is quite common south of San Francisco.

f. **Œ. cheiranthifo′lia Hornemann.** *Stems decumbent, often 2 ft. or more long, white, with a close pubescence, especially on the younger parts.* Leaves oblanceolate to ovate, the upper sessile. Ovary and calyx woolly. *Petals yellow, generally turning greenish when withering.* Pods angled, becoming contorted. This is common on the sands along the coast, chiefly south of San Francisco, and is quite variable.

IV. GODE′TIA, "Farewell to Spring"

Calyx tube prolonged beyond the ovary, funnel-shaped, with reflexed lobes somewhat united, deciduous. *Petals 4, generally rose-color, often marked with spots of deeper color. Stamens 8 in 2 sets, one shorter than the other*, and ripening earlier; anthers attached at the base. Stigmas 4, generally purple. Capsule 4-celled. The following species are the most easily distinguished and most common.

a. **G. lep′ida Lindl.** Annual, erect herbs with white, shining stems. Flowers in spikes. *Tips of the calyx lobes free in the bud.* Petals rose-color, with a darker spot near the top. *Capsule with a single row of seeds in each cell, sessile, narrowed towards the apex, ribbed, white-hairy.* Monterey County to Oregon.

b. **G. amœ′na Lilja.** Stems loosely branching below, with widely spreading branches. Flowers nodding in the bud, large and showy (an inch or more in diameter). Petals white, rose-color, or purple, with a darker spot at the center. *Capsules narrowed at both ends, on short pedicels.* From Monterey County northward.

c. **G. quadrivul′nera Spach.** Stems slender, a foot or two high. Leaves narrow, entire or slightly denticulate, an inch or two long. *Tips of the calyx lobes slightly free in the bud.* Petals purplish, about half an inch long. Stigma lobes short, purplish. *Capsule narrowed to the top, ribbed and hairy. Seeds in one row in each cell.* This species is widely distributed.

d. **G. purpu´rea Watson.** Stems leafy, a foot or two high. Leaves oblong, entire, an inch or two long. Flowers in a leafy terminal spike. *Tips of the calyx lobes not at all free in the bud.* Petals deep purple, half an inch long. Stigma lobes purple, short. *Capsule ovate to linear-oblong, sessile, not ribbed. Seeds in 2 rows in each cell.* From Oregon to Los Angeles.

e. **G. Bot´tæ Spach.** Erect, with few branches, 1–2 ft. high, almost smooth. Leaves linear-lanceolate, 1–2 in. long, entire or with a few teeth on the margin. Petals light purple, about an inch long. *Pod narrowed at each end, about an inch long, on pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. long.* This is common in southern California.

f. **G. epilobioi´des Wats.** Stems erect, slender, one foot or less high, slightly clothed with white down or smooth. Leaves linear. *Petals pale rose or white, a half inch or less long. Pod narrowed at each end*, an inch or less long. Common in southern California.

V. CLAR´KIA

Calyx tube prolonged beyond the ovary, funnel-shaped, with reflexed, united, deciduous lobes. *Petals 4, with long claws.* Stamens 8 in 2 sets, those opposite the petals often sterile. Anthers attached by the base. Pods linear.

The chief difference between *Clarkia* and *Godetia* consists in the clawed petals of the former.

a. **C. el´egans Dougl.** Stems simple or branched, from 6 in. to 6 ft. high. Divisions of the calyx united except on one side, deep wine-color on the inner surface. *Petals reddish purple, with long, slender claws and rhomboidal blades. Anthers all perfect.* Capsule nearly sessile, often woolly. Widely distributed.

b. **C. concin´na Greene (Eucharidium).** Stems slender, with spreading branches. Calyx tube very slender, an inch long. *Petals dark rose-color, 3-lobed. Stamens only 4.* Stigma lobes unequal. Capsules about an inch long, sessile. This is a very showy plant, blooming in summer. In the Coast Mountains.

c. **C. pulchel´la Pursh.** Stems branching, about a foot high. Leaves linear-lanceolate, 1–3 in. long, entire, smooth. *Petals rose-color, with 3 broad-spreading lobes, the claw with a pair of recurved teeth. Perfect stamens 4,* each with a scale on each side of the base. *There are 4 stamens that are rudimentary.* Stigma lobes dilated. Pod 1 in. long, 8-angled, on spreading pedicels. From northern California to British America.

LOASA´CEÆ. Blazing Star Family

Herbs covered with rough barbed hairs. Calyx tube attached to the 1-celled ovary with parietal placentæ. Stamens numerous, merging into the petals.

MENTZE´LIA, Blazing Star

Tall and erect, or loosely branching herbs, with stems white and shining. Flowers showy, yellow, orange or cream-color; from very small to 3 or 4 in. in diameter. The barbed hairs cause the plant to adhere to whatever it happens to touch. The numerous stamens and spreading petals give this plant a radiant appearance like a star. The species are local.

M. lævicau´lis T. & G. Biennial, with stout branching stems, 2–3 ft. high. Leaves lanceolate, 2–8 in. long. Flowers sessile on short branches, 3–4 in. broad, light yellow, blooming in the morning. Calyx tube naked. Petals 5–10. Stamens numerous. This is generally found growing in the beds of streams in the mountains through California to Washington.

CACTA´CEÆ. Cactus Family

Peculiar green fleshy perennial plants, armed with bundles of spines, and rarely possessing leaves. Flowers with numerous sepals, petals, and stamens, in several series, forming a cup above the 1-celled, many-ovuled ovary. Style 1, with several stigmas. Fruit a pulpy or, rarely, a dry 1-celled berry with numerous seeds. The following are the common genera.

I. MAMILLA´RIA, Bird's-nest Cactus

Round or oval plants, covered with spine-bearing tubercles. Flowers small, arising between the tubercles. *Ovary naked.* Seeds without endosperm.

II. ECHINOCAC´TUS, Indian Melon

Round or oval plants, usually ribbed, with bundles of spines on the ribs. Flowers from the youngest part of the ribs close above the growing bunches of spines. *Ovary covered with sepals.* Seeds with endosperm.

III. CE′REUS, Column Cactus

Oval or columnar plants, sometimes tall, ribbed, or angled, with bundles of spines on the ribs. Flowers larger than the two preceding, close above the bundles of full-grown spines. *Ovary covered with sepals.* Seeds without endosperm.

IV. OPUN′TIA, Jointed Cactus

Branching or jointed plants, with joints either flattened or cylindrical. Spines barbed, and accompanied by numerous short bristles that easily become detached. *Ovary bearing bristles in the axils of small terete deciduous sepals.* Seeds with the embryo coiled around the endosperm.

FICOI′DEÆ. FIG MARIGOLD FAMILY

Fleshy, succulent plants, with opposite leaves without stipules. Petals and stamens numerous, inserted on the tube of the calyx, which is adnate to the capsule.

MESEMBRYAN′THEMUM, Fig Marigold, Ice Plant

Calyx lobes 5, unequal. Petals numerous, linear. Stamens indefinitely numerous. Capsule with as many cells as styles (4–20), usually 5, dehiscent at the top.

M. æquilatera′le Haworth. FIG MARIGOLD. Perennial, with stout, usually prostrate stems. Leaves thick, 3-sided, smooth, 1–3 in. long. Flowers crimson, nearly sessile. Fruit edible. This is common on the coast.

ARALIA′CEÆ. GINSENG FAMILY

Perennial herbs or shrubs, generally with woody stems. Umbels not regularly compound. Styles and carpels more than 2. Fruit fleshy, forming a berry or drupe.

I. ARA′LIA, Ginseng, Spikenard

Calyx 5-toothed or entire. Petals 5, ovate. Stamens 5. Pistil with the ovary 2–5-celled, and the styles free or slightly united at base. Leaves alternate, compound. Umbels simple, either in racemes or panicles. *Pedicels not jointed.*

A. Califor′nica Watson. Herbs, 8–10 ft. high, from a thick aromatic root. Leaves large, bipinnate, with ovate-lanceolate leaflets, simply or doubly serrate. Umbels globular, generally in panicles. Fruit when ripe forming a purple berry. This is frequent along shaded streams.

II. FAT′SIA, Devil's Club

Densely prickly shrubs with large palmately lobed leaves and greenish white flowers in dense paniculate umbels. *Calyx teeth wanting.* Petals 5, valvate in bud. Stamens 5, alternate with the petals. Ovary 2–3-celled ; styles 2. Fruit a drupe. *Pedicels jointed.*

F. hor′rida Benth. & Hook. Stems stout, woody, creeping at base, leafy at summit, very prickly. Leaves roundish, heart-shaped in outline, prickly on both sides. Styles united to the middle. This is common in shady woods from Oregon northwards. It forms thickets which, on account of the thorny stems, are almost impassable.

UMBELLIF′ERÆ. Parsley Family

Herbs with hollow, grooved stems and small flowers in umbels. Calyx usually a 5-toothed rim around the top of the ovary. Petals 5, small. Stamens 5, inserted on a disk on the top of the ovary. Ovary 2-celled and 2-ovuled, ripening into 2 carpel-like akenes, which readily separate from each other. Each carpel bears longitudinal ribs, in the furrows of which secondary ribs often occur. On a cross-section of the fruit the oil tubes are seen as dots. They traverse the spaces between the ribs, and are pretty near the surface of the fruit. The seeds contain a small embryo enclosed in considerable endosperm. The family is difficult, and the flowers are so much alike that the different genera and species are to be distinguished from each other chiefly by the characteristics of the fruit.

I. SANIC′ULA, Snakeroot, Sanicle

Leaves palmately lobed or pinnately divided. Umbels simple or imperfectly compound, with flowers sessile or on short pedicels. Bracts of the involucre leafy, toothed; those of the involucels small, entire. *Fruit covered with hooked prickles or tubercles.* Seeds round, with oil tubes more or less obscure.

a. **S. arctopoi′des H. & A.** YELLOW MATS, FOOTSTEPS OF SPRING. Stems prostrate, branching from the base. Leaves deeply 3-lobed, with the divisions raggedly cleft. Fruit on short pedicels. *This is very conspicuous in early spring, dotting the ground with its small mat of yellowish green flowers and leaves, during the rainy season.* It is generally in bloom early in January. Throughout California.

b. **S. bipinnatif′ida Dougl.** PURPLE SANICLE, NIGGER-BABIES. Erect, with lower leaves opposite, upper alternate, pinnately 3–5-parted, with the divisions toothed or lobed (generally the teeth are tipped with bristles). *Flowers purplish, in umbels with 3 or 4 elongated rays.* Throughout California.

c. **S. tubero′sa Torr.** *Stems low from a small tuberous root.* Leaves finely dissected. Involucre with 1–4 rays, leafy; involucels small, unequally lobed. Heads small. Flowers yellow. *Fruit covered with tubercles instead of prickles.* Widely distributed, often growing on stony hills. There is a disagreeable odor about the plant.

II. HERACLE′UM, Cow Parsnip

This is a stout, tall herb with large thrice-compound leaves. *Leaflets broad, deeply and irregularly toothed.* Umbels large, compound, with many-leaved involucels. Calyx teeth small or none. *Petals white, conspicuous, the outer ones 2-cleft and larger than the inner.* Fruit tipped with a thick conical enlargement of the style, with 3 blunt ribs on the outside of each carpel, and a large oil tube in each interval between the ribs. Seeds flat.

H. lana′tum Michx. This is the only species. The stem is generally woolly. It grows everywhere not far from water.

III. DAU′CUS, Carrot, Rattlesnake Weed

Calyx 5-toothed, fruit oblong, with the primary ribs bristly, and the secondary ones winged with a row of barbed prickles more or less united. Oil tubes under the wings. Leaves much dissected with very small segments. Involucres like the leaves, but smaller. *Outer rays of the umbel longest and folding over the others in fruit.* Flowers greenish.

D. pusil′lus Michx. Yerba de la Vibora, Rattlesnake Weed. Annual, erect, simple or branched, with the umbels terminating the stems. The fruit tastes something like lemon peel. This is the most widely accepted antidote for the bite of the rattlesnake. Widely distributed.

CORNA′CEÆ. Dogwood Family

Generally trees or shrubs, with opposite simple and entire leaves without stipules. Flowers in heads or cymes. Sepals, petals, and stamens 4. Calyx adnate to the 1 or 2 celled ovary, which becomes a 1 or 2 seeded drupe or berry in fruit. The seeds have hard endosperm and a minute embryo.

COR′NUS, Dogwood

Calyx minutely 4-toothed. Petals white or yellowish green.

a. **C. Nuttal′lii Audubon.** Large-flowered Dogwood. This is usually a small tree with smooth bark. *Flowers numerous in a head surrounded by a conspicuous involucre of large white or yellowish bracts often tinged with red and resembling petals. Berries bright red in clusters.* This grows along streams, chiefly in the northern part of California.

b. **C. pubes′cens var. Califor′nica C. & R.** Common Dogwood. Shrubby, with smooth, reddish branches. Leaves ovate to oval, acute at base, acute or pointed at top. Flowers white in cymes, flowering almost throughout the year. Fruit dull white, rounded, with stone somewhat flattened, ridged on the sides and furrowed on the edge. This is common throughout the state, growing along streams.

c. **C. stolonif′era Michx.** *Shrub 3–9 ft. high*, bearing stolons. Stems bright red-purple and smooth. Leaves lanceolate to oblong, pointed at top, obtuse at base, white on the lower surface from the close pubescence. Flowers in small cymes. Calyx teeth minute, petals white, fruit white or lead-color. Oregon to British Columbia.

GARRYA′CEÆ. Silk-tassel Bush Family

GAR′RYA, Silk-tassel Bush, Quinine Bush

Evergreen shrubs with opposite leathery leaves. Flowers grayish green, apetalous, diœcious, in pendent axillary catkins, which are solitary or several. Sterile flowers with 4-parted calyx, and 4 conspicuous stamens on distinct filaments. Fertile flowers with a 2-lobed calyx or none, styles 2, ovary 1-celled, containing 2 ovules. Fruit a berry with a brittle outer covering, pulpy within, and containing 1 or 2 seeds. This is the only genus.

a. **G. Fremon′tii Torr.** Leaves becoming glabrous, not wavy-margined. Fruit very bitter, purple. Sterile catkins 2–3 in. long. Middle California.

b. **G. ellip′tica Dougl.** Leaves white-woolly on the lower surface, wavy-margined. Fruit, when ripe, red-purple, pleasantly acid, with a hint of bitterness. The sterile catkins are from 2 to 5 in. long, and look like fringe. From Monterey County to Oregon and Washington.

ERICA′CEÆ. Heather Family

Herbs or woody plants. Leaves simple, evergreen or deciduous, without stipules. Stamens as many or twice as many as the parts of the corolla; anthers 2-celled, opening by little holes at the top. Ovary generally with as many cells as there are parts to the corolla, inferior in *Vaccinium* but superior in the other genera. Style simple. Fruit a berry or a pod with axillary placentæ.

I. VACCIN′IUM, Huckleberry

Shrubby. Calyx and corolla apparently on the summit of the ovary, the calyx tube being adnate to the ovary. Stamens

8–10, with separate cells to the anthers, which taper upwards. *Fruit a berry crowned with the 5-toothed calyx.*

a. **V. ova′tum Pursh.** Leaves evergreen, glossy, serrate, acute. Flowers crowded in short clusters in the axils of the leaves and at the ends of the branches. Corolla bell-shaped, pink. Stamens 10. *Berries dark blue or purple, edible.* This is common in the Coast Mountains from Monterey County to Oregon.

b. **V. parvifo′lium Smith.** Stems much branched, with the branches sharply angled. Leaves deciduous, oblong, entire, dull green above, pale beneath. Corolla globular. Stamens 10. Anthers with long tail-like appendages on the back. *Berries pale red, edible.* Northern California to Alaska.

II. AR′BUTUS, Madroño, Madrone

Trees with thick, evergreen, alternate leaves. Flowers white, in terminal panicles. Calyx small, 5-lobed. Corolla urn-shaped, with 5 recurved teeth, and large honey-glands near the base. Stamens 10 ; anthers flattened, with a pair of horns on the back below the summit. Ovary raised on a disk, 5-celled. *Fruit, when ripe, a round red berry with a rough, tubercled surface, edible but rather dry.*

A. Menzie′sii Pursh. This is a beautiful tree or sometimes a shrub, with smooth, brownish red bark, which peels off in the summer. The leaves are large, oblong, serrate, bright green above, pale beneath. The tree is beautiful at all times; when in bloom fragrant and adorned with large panicles of flowers like lilies of the valley; in autumn gorgeous with the large clusters of fruit, varying in color from greenish yellow to bright scarlet, as large as green peas. In the Coast Mountains and Sierra foothills to Puget Sound.

III. ARCTOSTAPH′YLOS, Kinnikinick, Manzanita

Shrubs with alternate, evergreen leaves and smooth bark that peels off in summer. Flowers white or pink, variously clustered. Calyx small, 5-lobed. Corolla urn-shaped, with 5 recurved teeth and large honey-glands near the base. *Stamens 10, anthers flattened, with a pair of horns on the back at the summit.* Ovary raised on a disk, 5-celled. Fruit a berry, containing stony seeds that are separable or cohere into one.

a. **A. Manzani′ta Parry.** Common Manzanita. Erect and branching, becoming tree-like, with smooth, polished dark-red stems and branches. The young shoots and the leaves are ashy gray, becoming smooth with age. The leaves are generally vertical by a twist in the petiole. Flowers crowded in short racemes on smooth pedicels with short, pointed bracts. Fruit smooth, about the size of a pea. This sometimes becomes a tree. In valleys of the Coast Mountains.

b. **A. Stanfordia′na Parry.** A delicately branched shrub, either erect or spreading, with slender peduncles and pedicels, small scale-like bracts and dark-green, smooth leaves, round and small. *The flowers are smaller than in other species, and are deep rose-color, rarely white.* The berries are smooth, rather small, and the seeds coälesce more or less. This is common in the northern Coast Mountains, and is perhaps the most beautiful species.

c. **A. tomento′sa Dougl.** *Shrub with hairy stems* and leaves more or less clothed with a close pubescence. *Flowers in short panicles with leafy bracts which are most conspicuous in the buds.* Flowers white, rather large. Berries with the seeds coalescing more or less. This is one of the most widely distributed species, and embraces a great many forms chiefly distinguished by the amount of pubescence. It is never destroyed by brush fires, and the old roots become chunks of solid wood.

d. **A. canes′cens Eastwood.** This is somewhat similar to the preceding, but *the entire plant is white-downy.* The flowers are more often pink than white, and the habit of the plant is more spreading. The bracts are large and leaf-like. This is widely distributed in northern California.

e. **A. Anderso′nii Gray.** This is similar to **A. tomento′sa.** The leaves are thin, bright green, smooth or slightly pubescent, with *the base arrow-shaped or heart-shaped*, either sessile or short-petioled. It is found in the Coast Mountains of California, in San Mateo, Santa Cruz, and Alameda Counties.

f. **A. vis′cida Parry.** Shrub 3–5 ft. high, with smooth, pale-gray or glaucous leaves. Panicles erect in bud, becoming pendent later. Flowers pink or white, rather small, on slender, *very viscid pedicels.* Fruit a berry containing seeds that coalesce more or less. The bracts are small and scale-like. This species is very abundant in the foothills of the Sierra Nevada and in the hills of Lake and Mendocino Counties.

g. **A. glau′ca Lindl.** Big-berried Manzanita. The foliage of this is always glaucous and smooth. It is distinguished from all other species by the large berries, often ¾ in. in diameter, with *the stones consolidated into a thick, solid mass.* Most common southward.

h. **A. bi′color Gray.** Shrub 3 or 4 ft. high. Leaves oblong to oval, 1–2 in. long, leathery, clothed with white down on the lower surface, green and glabrous on the upper. Corolla rose-color, small. *Fruit a smooth berry with a solid seed.* Southern California, especially in San Diego County.

i. **A. U′va-Ur′si.** Kinnikinick. Stems forming a mat on the ground. Leaves small, very glossy. Flowers in short, simple racemes. *Fruit bright red and smooth when ripe.* Northern California to British Columbia.

There are many other species more local and difficult to distinguish.

IV. GAULTHE′RIA, Salal

Stems shrubby but slender, ascending or spreading, creeping under ground. Leaves alternate, broad, evergreen, glossy. Flowers nodding, solitary or in racemes, in the axils of the leaves. *Calyx 5-cleft, becoming fleshy in fruit and enclosing the capsule.* Corolla 5-toothed. *Stamens 10 within the corolla, the anthers tipped with bristles.* Ovary 5-celled, with many ovules, in fruit forming a sweet aromatic berry which is edible.

G. Shal′lon Pursh. Salal. Stems sometimes 3–4 ft. high, almost climbing among trees and bushes. Racemes glandular. Corolla pink, urn-shaped. *Fruit black when ripe, with dark-purple pulp.* From Santa Barbara to British Columbia.

V. RHODODEN′DRON, Azalea

Calyx very small. *Corolla large, funnel-form, 5-lobed. Stamens 5–10, with long, slender filaments reclining along the lower side of the flower.* Capsule woody, dehiscent from the summit, at the partitions, by 5 valves. Flowers showy, in umbels, the bracts falling as the flower opens.

a. **R. Califor′nicum Hook.** Rose Bay. *Shrub with smooth evergreen leaves. Flowers rose-color, numerous, in a terminal umbel.* Upper lobes of the corolla yellowish and spotted within. This is a beautiful shrub of northern California, Oregon and Washington, often growing in patches covering acres. It is the State Flower of Washington.

b. **R. occidenta′le Gray.** AZALEA. *Shrub with bright-green deciduous leaves. Flowers large, fragrant, appearing after the leaves, in numerous umbels.* Corolla viscid, white or rose-color, the upper lobes blotched with yellow within. Stamens and styles very long. This is found along streams in both the Coast and Sierra Nevada Mountains.

VI. LE′DUM, Labrador Tea

Shrub *with alternate, evergreen leaves more or less covered with resinous dots.* Flowers white, in corymbs or umbels. Calyx 5-lobed, small. Corolla of 5 obovate, widely spreading petals. Stamens 5–10, as long as the petals. *Pod 5-celled, with 5 valves opening from the base upwards.*

a. **L. glandulo′sum Nutt.** *Leaves smooth on both sides, but paler and more glandular beneath.* Flower clusters often crowded, terminal or axillary. This is common at high elevations in the Sierra Nevada and on the coast from northern California to British Columbia.

b. **L. latifo′lium Ait.** *Leaves densely white-woolly beneath, becoming brownish, margins with the edges turned back*, oblong, obtuse, 1–2 in. long, ½ in. wide. Flower clusters all terminal. Northern California to British Columbia.

VII. CHIMAPH′ILA, Prince's Pine

Herbs with low stems from slender rootstocks. Leaves evergreen, alternate or sometimes opposite, toothed. Flowers few, fragrant, waxy-looking, in terminal corymbs. Petals 5, widely spreading, regular, orbicular, concave. Stamens 10, on short filaments which are dilated and hairy in the middle. *Stigma round-shield-shaped, concealing the short style, 5-rayed. Pod splitting from the top downwards, not woolly on the edges of the valves.*

a. **C. umbella′ta Nutt.** Stems about 6 in. to a foot high, with the leaves often in whorls, not spotted. Peduncle 4–7-flowered, with the bracts narrow and deciduous; *filaments hairy on the margins only.* California to British Columbia.

b. **C. Menzie′sii Spreng.** Stems about 6 in. high, with a few branches from the base. Leaves sometimes mottled with white. Peduncles 1–3-flowered. *Filaments slender, with a woolly dilated central part.* California to British Columbia.

VIII. PYR′OLA, Wintergreen

Herbs with radical leaves and *flowers nodding in racemes, on scapes.* Calyx 5-lobed. Corolla with 5 incurved petals. Stamens 10, usually declined. *Anthers erect in bud, 2-horned at base, but becoming inverted when the flowers expand.* Style declined or straight. Fruit a capsule opening down the middle of the cell walls on the back.

a. **P. rotundifo′lia L.** Leaves round, shining or dull, on long petioles. Scapes from 6 in. to a foot high. Flowers white, pink or rose-color, almost ½ in. in diameter. Anthers narrowed at top. Style declined, with a collar at base of the stigma. In wet places in the mountains, widely distributed.

b. **P. pic′ta Smith.** *Leaves orbicular, thick, veined or blotched with white, often purplish beneath.* Scapes about 6 in. high, 7–15-flowered. Petals greenish white, longer than the sepals. Northern California to Alaska.

c. **P. aphyl′la Smith.** *Leafless or with a few small, poorly formed leaves.* Scapes reddish, 6 in. high. Flowers similar to the above, rose-color. In deep woods from California to Washington.

PRIMULA′CEÆ. PRIMROSE FAMILY

Herbs with perfect, regular flowers, parts of the calyx and corolla 5 (sometimes 4, 6, or 8). Stamens equaling the lobes of the corolla and opposite them, inserted on the tube of the corolla. Pistil with a single style and stigma, the ovary 1-celled, with a globular central placenta.

I. DODECA′THEON, Twelve Gods, Shooting Stars, Prairie Pointers, Cyclamen

Herbs with leaves clustered at the base of the scape. Flowers showy, in simple, terminal umbels. *Calyx 5-cleft, with the divisions reflexed in flower, erect in fruit. Corolla with an extremely short tube, an open throat, and 5 reflexed narrow divisions, which are white, rose-color or purple. Stamens inserted on the throat of the corolla, with short monadelphous filaments, and long yellow or violet anthers conniving around the long style and forming the point of the flower.*

a. **D. Henderso′ni Gray.** *Roots becoming small tubers and each forming a new plant.* Leaves ovate or obovate, smooth, on broad petioles. Scape 6–12 in. high. Divisions of corolla 4 or 5, rose-purple; tube darker, with a ring of yellow. Anthers erect. Pod twice as long as the calyx, opening by a lid below the summit. This is the commonest species in early spring on hillsides of the Coast Mountains, and extends from middle California to Oregon.

b. **D. Clevelan′di Greene.** *Roots somewhat fleshy, but not forming tubers. Stems and leaves pale green and glandular.* Leaves ascending, spatulate or obovate. Divisions of corolla bright purple, yellow at base; tube dark purple with yellow lines. Pods opening by a lid at top. Southern California.

There are several other species, chiefly growing in the higher mountains.

II. TRIENTA′LIS, Star-flower

Low perennial herbs from tuber-bearing, slender rootstocks. *Stems simple, with the leaves in a whorl below the flowers. Flowers small, star-shaped, on slender pedicels.* Calyx and corolla 7-parted (sometimes 6–9-parted), with divisions widely spreading. Stamens with slender filaments united into a ring at the base. Capsule splitting into five parts, with few seeds.

T. Europæ′a var. latifo′lia Torr. This grows in the woods and blooms in the spring. The petals are white or rose-color.

III. STEIRONE′MA

Stems erect, leafy. Leaves entire, opposite or whorled. Flowers yellow, axillary, nodding on slender pedicels. Corolla wheel-shaped, apparently with petals distinct, each division wrapped around its stamen in the bud. *Filaments united around the base of the corolla in a ring, every alternate one being sterile.* Capsule many-seeded.

S. cilia′tum Raf. Stem simple. Leaves ovate-lanceolate, 2–4 in. long, rounded or somewhat *heart-shaped at base*, with long ciliate petioles. In moist thickets. Washington. Summer.

IV. ANAGAL′LIS, Pim′pernel, Poor Man's Barometer

Spreading or prostrate annuals, with stem leaves opposite or whorled. Flowers on axillary peduncles, salmon-color, with a darker spot in the center (rarely blue or white); *calyx and corolla wheel-shaped. Filaments bearded.* Capsule globose, the top falling off as a lid.

A. arven′sis L. This is common everywhere, and has been introduced from Europe.

PLUMBAGINA′CEÆ, Sea Pink Family

Ours are maritime herbs, with all parts of the flower 5, except the 1-celled, 1-ovuled ovary. Leaves alternate, entire, clasping the stem. Calyx tubular or funnel-form, 5-toothed. Corolla with 5 petals, united at base into a ring. Stamens 5, opposite the petals, and inserted at their base. Ovary 5-angled at summit, with 1 ovule; styles 5.

I. ARME′RIA, Thrift

Stemless perennials, with narrow, linear, persistent leaves in close tufts. Flowers in a head subtended by an involucre, on a long scape. Corolla 5-parted, of 5 distinct petals.

A. vulga′ris Willd. Sea Pink. Corolla rose-color. This is common along the coast, blooming in spring.

II. STAT′ICE, Sea Lavender

Flowers in small one-sided spikes crowded at the ends of the numerous widely spreading branches. Leaves with a broad, tough blade tapering to a petiole.

S. Limo′nium L. var. Califor′nica Watson. Sea Lavender. Corolla violet. This is common in salt marshes, blooming in summer.

OLEA′CEÆ. Ash Family

Trees or shrubs having opposite leaves without stipules. Corolla 2 or 4 lobed. Stamens 2. Ovary 2-celled, with 2 ovules hanging from the top of each cell. Fruit often 1-celled and 1-seeded, either a stone fruit, as the olive; a pod, as the lilac; or a winged fruit, as the ash.

FRAX′INUS, Ash

Trees or shrubs with compound leaves and diœcious or polygamous flowers. Calyx small, 4-cleft. Petals 2 or none. Stamens 2, with large anthers. Fruit winged from the top.

a. **F. dipet′ala Hook. & Arn.** FLOWERING ASH. A small tree or shrub with 5–7 separate leaflets on petioles. Flowers showy, in panicles. Calyx 4-toothed. *Petals 2, white, as long as the anthers.* This grows along streams in the Coast Mountains.

b. **F. Orega′na Nutt.** OREGON ASH. A large tree with dark-colored bark. Leaflets 5–7, entire, sessile, usually tomentose when young, becoming smooth with age. *Flowers without petals.* From Fresno County, in the mountains, to Oregon and Washington.

GENTIANA′CEÆ. GENTIAN FAMILY

Glabrous herbs with entire opposite leaves without stipules. Stamens as many as the lobes of the corolla, inserted on its tube, and alternating with the lobes. Stigmas 2, sessile or on one style. Ovary 1-celled. Fruit with 2 parietal placentæ dehiscent at the partitions. Seeds with abundant endosperm around the minute embryo.

ERYTHRÆ′A, Canchalagua

Low, much-branched herbs, with numerous showy flowers in cymes. Corolla rose-color, salver-form, with lobes convolute in the bud. Anthers twisting spirally after the pollen is shed. Stigmas at first united, wedge-shaped or fan-shaped, afterwards spreading.

E. venus′ta Gray. Corolla deep pink, with yellow center; divisions half as long as the tube. This is the handsomest and most widely distributed species.

(True gentians are rare in California, and are mostly confined to the high mountains.)

ASCLEPIADA′CEÆ. MILKWEED FAMILY

Herbs with a milky juice and a tough inner bark having a fiber like flax. Leaves opposite, entire. Flowers peculiar in shape, in umbels. Sepals and petals each 5, reflexed. Anthers forming a crown united to the solid stigma, and with peculiar hood-like appendages surrounding it. The anther cells are orange in color, and are concealed in the crown, and have the outline of a pair of scales. Fruit a pod, opening at one side. Seeds arranged symmetrically on a thick axis, each provided with a tuft of silky down.

I. ASCLE′PIAS, Silkweed, Milkweed

The five hoods of the stamens are each provided with a protruding horn.

a. **A. specio′sa Torr.** Covered with white down. Stems stout, erect, with large, thick, oblong leaves, opposite or whorled. Umbels on peduncles shorter than the leaves, many-flowered. Flowers large, purple; the hoods nearly half an inch long, spreading, *with a horn-like prolongation from the summit; besides the short, inflexed true horn. Follicles rough with soft spinous processes.* California to Washington. This is inclined to become a troublesome weed.

b. **A. Mexica′na Cav.** Stems rather slender, 3–6 ft. high. Leaves in whorls of 3–6, linear, sessile, smooth, 3–6 in. long. Umbels clustered to form a corymb, densely flowered on peduncles longer than the petioles. Flowers rather small, greenish white or tinged with purple. *Hoods broadly ovate, shorter than the beak-like, incurved horn.* Follicles slender, tapering to the top. California to Oregon, spreading as if introduced, along highways.

II. GOMPHOCAR′PUS

The five hoods are without horns.

G. cordifo′lius Benth. Smooth, with ascending stems, 2–3 ft. high. Leaves ovate, clasping by a heart-shaped base, opposite or sometimes in threes. Umbels 1–4, with the flowers loose, on thread-like pedicels. Corolla dark red-purple. Horns tipped with a point where the open edges come together. Follicles smooth, inclined to be erect, on deflexed pedicels. This is common in California, blooming in late summer, and growing in dry ground in the valleys and foothills.

APOCYNA′CEÆ. DOGBANE FAMILY

Perennial herbs with milky juice and opposite entire leaves without stipules. Flowers in cymes or corymbs, regular, all the parts 5, except the pistil, which consists of 2 ovaries, with the styles and stigmas united. Fruit a pair of slender follicles. Seeds with a tuft of silky down.

APOC′YNUM, Indian Hemp, Dogbane

Corolla bell-shaped, 5-cleft, with 5 scales opposite the lobes and near their base. Stamens inserted on the base of the corolla, with short filaments and arrow-shaped anthers, uniting into a ring.

a. **A. androsæmifo′lium L.** *Corolla rose-color*, with revolute lobes and a bell-shaped tube longer than the calyx. This is generally much branched, and the flowers are numerous in loose cymes. Widely distributed.

b. **A. cannab′inum L.** *Corolla white*, with erect lobes, and the tube not longer than the calyx. Flowers small, in dense cymes. This grows in marshy places. Widely distributed.

POLEMONIA′CEÆ. PHLOX FAMILY

Herbs or rarely shrubs. Leaves simple or divided, without stipules. All parts of the flower 5, except the pistil, which has a 3-lobed style and a 3-celled ovary with axillary placenta. Stamens on the tube of the corolla, alternate with its lobes. Embryo with endosperm.

GIL′IA

Herbs or rarely shrubs. Leaves various, alternate or opposite. Calyx partly herbaceous, generally papery below the folds, with lobes narrow and acute. Corolla from funnel-form and salver-shaped to bell-shaped and wheel-shaped. The seeds generally become mucilaginous when wet. The flowers are showy, and among our most characteristic spring annuals; the species are numerous, and are not always easily distinguished. Only the most distinct and common are given.

a. **G. grandiflo′ra Dougl.** SALMON-COLOR GILIA (**Collo′mia**). Flowers crowded at the summit of an erect stem; *corolla pale salmon-color*, with the tube nearly an inch long and the border almost as broad. Widely distributed.

b. **G. squarro′sa Esch.** SKUNKWEED (**Navarre′tia**). Stems low, branching diffusely, viscid. Leaves and bracts pinnately parted, with spiny divisions. *Flowers small, deep blue.* This blooms late in the summer. *The whole plant has the odor of the skunk.* Widely distributed.

c. **G. tri′color Benth.** BIRD'S EYES. Stems slender, branching. *Corolla ½ in. long, with a yellow tube, the funnel-form throat marked with deep violet-purple, and the limb white or lilac.* It is sweet-scented and very pretty. Throughout western California.

d. **G. dicho′toma Benth.** EVENING SNOW (**Linan′thus**). Erect and branching herbs with very slender stems. The leaves are few, small, and far apart. *Flowers large, terminating the peduncles, salver-form, with the divisions convolute in the bud, showing only the dull-pink outer edges, opening about 4 o'clock.* Where they are abundant they look like snow on the ground. The white flowers are often more than an inch in diameter, and have a sweet, heavy perfume. Throughout western California.

e. **G. androsa′ceus Benth.** (**Linan′thus**). Stems leafy, with palmately parted leaves, apparently whorled, with thread-like divisions. Flowers crowded in a terminal cluster. *Corolla salver-form, with a long, slender tube, rose-color, lilac or white.* This is a handsome and widely distributed species, but variable and difficult to distinguish from allied species.

f. **G. micran′tha Steud.** Smaller in all its parts than the preceding, with the tube of the corolla long and thread-like, 1–1½ in. long. Flowers small, rose-color, white, or lilac. Common through California.

g. **G. cilia′ta Benth.** Stems slender, erect, clothed with white hairs. Flowers and bracts in a dense, capitate cluster, very hispid and ciliate. Corolla small, pink or white, extending beyond the bracts but little. This is widely distributed through California, and common.

h. **G. dianthoi′des Endl.** FRINGED GILIA. Stems from an inch to less than a foot high, simple or branching from the base. Leaves thread-like. *Corolla pink, with yellowish throat and very short tube.*

The corolla lobes are fringe-toothed. This is common in southern California, and is one of the prettiest spring annuals.

i. **G. Califor´nica Benth.** *Shrubby, 2 or 3 ft. high, with rigid branches.* Leaves *with spiny divisions*, widely spreading, clustered. Corolla *rose-color, fading to lilac, salver-form*, with the border an inch or more in diameter, the lobes often shortly fringed on the margin. This is common in southern California, chiefly on dry hills. It is very showy, with its numerous flowers, like those of phlox, in dense clusters terminating the branches.

j. **G. aggrega´ta Spreng.** Scarlet Gilia, Wild Cypress. Stems erect, simple or branched, viscid. Leaves compound, with narrow, linear leaflets. Flowers in a close panicle. *Corolla salver-form, nearly 1 in. long, scarlet, pink or white*, extremely variable in color. This grows in the mountains or near streams on the plains Summer.

CONVOLVULA´CEÆ. Morning-glory Family

Twining or trailing herbs, with alternate leaves, and flower solitary or few, on peduncles in the axils of the leaves. Caly of distinct sepals. Stamens alternating with the parts of th corolla. Ovary 2 or 3 celled, with a pair of ovules in eac cell. Capsule globular, containing 1–4 seeds.

I. CONVOL´VULUS, Morning-glory

Corolla open funnel-form, with the border 5-angled. Stamens inserted within the tube. Style slender. Stigmas 2. Capsule 2-celled and generally 4-seeded, with dehiscent septifragal dehiscence (the valves separate from the partition). Cotyledons folded and crumpled in the seed with some endosperm.

a. **C. Soldanel´la L.** Seaside Morning-glory. *Low and trailing herbs, with stem and leaves fleshy. Leaves kidney-shaped, on long petioles.* Bracts of the peduncle close to the calyx, thin in texture. Corolla pink or purple, an inch or more in length. Pod becoming 1-celled. This grows on sandy beaches.

b. **C. villo´sus Gray.** Stems trailing. *Leaves hastate.* Bracts narrow, close under the calyx. *Corolla cream-color*, an inch long. *The entire plant is covered with a close, soft, velvety, white down.* Throughout California, but not very common.

c. **C. lute′olus Gray.** Stems often twining over high bushes, smooth, blooming at all seasons. *Peduncles as long as the leaves, with a pair of linear or lanceolate bracts a little below the flower* (no bracts directly under the calyx). Corolla pale cream-color, or (when growing near the coast) light or deep rose-color. Throughout California.

II. CUS′CUTA, Dodder, Love Vine

Parasitic plants with yellow or orange stems, scales in place of leaves, and densely clustered small white flowers. Calyx 5-cleft or parted. Corolla bell-shaped or tubular. Stamens inserted on the throat of the corolla, with fringed scales below. Ovary 2-celled, containing 4 ovules. Styles 2, distinct. Embryo without cotyledons, thread-like, spirally coiled in hard endosperm. The seeds germinate in the soil, but do not form roots there. Instead, they attach themselves to the other plants by means of little roots, and take all their nourishment from their hosts.

a. **C. sali′na Engelm.** Salt-marsh Dodder. *Corolla having a shallow bell-shaped tube.* Capsule pointed. This grows in salt marshes on plants belonging to the *Chenopodiaceæ.*

b. **C. subinclu′sa Durand & Hilgard.** *Corolla with a rather long, urn-shaped tube.* Capsule conical. This grows on shrubs or coarse herbs.

HYDROPHYLLA′CEÆ. Baby-eyes Family

Herbs, or rarely shrubs, with alternate leaves without stipules (rarely opposite). Flowers in coiled spikes or racemes, usually showy. Calyx 5-parted, or of 5 separate sepals. Corolla 5-lobed. Stamens on the corolla tube, and alternate with its lobes and shorter. Styles 2 or 2-cleft. Capsule 1 or 2 celled, with 2 parietal placentæ, splitting along the back of each valve.

I. HYDROPHYL′LUM, Waterleaf

Herbs from fleshy, running rootstocks. Leaves large, alternate, pinnately compound. Flowers white or blue, in close or open cymes, on long peduncles. Corolla bell-shaped, with a honey-gland at the base of each lobe. Stamens and style longer than the corolla. *Filaments bearded at the middle.* Styles 2-cleft. *Ovary 1-celled.*

a. **H. occidenta′le Gray.** Stems perennial, 1–2 ft. high, hairy. Leaves broad, pinnately divided; divisions 7–15, oblong, 1–2 in. long, the apex cut into long, uneven teeth, obtuse. Cymes on long peduncles, densely flowered. Calyx with erect, narrow, lanceolate, obtuse divisions. Corolla pale violet or white. California to Washington.

b. **H. capita′tum Dougl.** BEAR'S CABBAGE. Low, from many fleshy roots. Leaves pinnately 5–7-parted or divided, with the divisions 2–3-lobed or cleft into oblong, mucronate lobes, soft-hairy, broadly ovate in outline, 2–3 in. long. Flowers densely clustered in close cymes like heads, on peduncles shorter than the petioles. Calyx clothed with stiff hairs. Corolla dull white or violet. From California, in the mountains at rather high elevations, to Washington. It comes up and blooms very soon after the snow melts.

II. NEMO′PHILA

Annual herbs, flowering very early, with the leaves pinnately lobed or divided, the lowest leaves opposite. Flowers solitary, on long peduncles in the axils of the leaves. Calyx 5-parted, with a reflexed lobe at each sinus, enlarging and covering the fruit. Corolla generally saucer-shaped, the throat within having 10 scales. Style 2-cleft. Capsule 1-celled.

a. **N. auri′ta Lindl.** CLIMBING NEMOPHILA. Stems succulent, long and weak, clinging for support to other plants by means of stiff reflexed bristles. *Leaves deeply cut into 5–9 lobes, curved downwards, dilated at base, and auriculate.* Corolla violet, the throat purplish. Southward from San Francisco.

b. **N. macula′ta Benth.** Low annuals, growing in the higher Sierras. *Corolla white, with a violet spot on each lobe.*

c. **N. insig′nis Dougl.** BABY-BLUE-EYES. Low, spreading, growing in sandy places. *Corolla clear blue, nearly an inch in diameter.* This is the commonest species.

d. **N. atoma′ria Fisch. & Meyer.** Low, spreading, growing in wet places. *Corolla white, dotted with dark purple.*

e. **N. interme′dia Bioletti.** Taller than the last two, growing amid the brush. *Corolla light blue, with lines and dots radiating to the center.*

III. ELLIS′IA

Leaves once or twice divided. Flowers small and white. *Calyx without the reflexed lobes.* Corolla generally shorter, or but little longer than the calyx, which enlarges under the fruit. Style 2-cleft. Capsule 1-celled.

a. **E. membrana′cea Benth.** *Stems succulent, light-green, smooth except for some stiff bristly hairs that sometimes help support the weak stems.* Leaves pinnately divided into 3–9 obtuse, linear divisions with margined petioles. This generally grows in shady and damp places. From middle California to San Diego.

b. **E. chrysanthemifo′lia Benth.** Stems much branched. Leaves 2 or 3 times divided into small and short divisions. *Flowers in loose racemes on short, slender pedicels.* From middle California to San Diego.

IV. PHACE′LIA

Herbs with simple or compound leaves, and flowers in loosely or closely coiled spikes or racemes. *Calyx deeply 5-parted, without reflexed lobes.* Corolla readily falling, blue, white, or purple (rarely rose-color), from wheel-shaped to funnel-form, with vertical scales attached between the bases of the filaments, sometimes attached to the filaments. *Pistil with 2-cleft style and 2-celled ovary.* Seeds 4 to many.

a. **P. circina′ta Jacq.** Perennial from a stout root, a foot or two high. *Leaves grayish green, hairy, simple, or the lowest compound with 1 or 2 pairs of leaflets.* Spikes crowded, conspicuously coiled. Corolla small, whitish or lilac. Stamens conspicuous. This is found in many forms and is widely distributed.

b. **P. divarica′ta Gray.** Annual, low, with spreading branches inclined to be prostrate. *Leaves oblong on petioles shorter than the blades, simple or with 1 or 2 teeth or lobes at the base.* Flowers in loose racemes, corolla bluish purple, $\frac{3}{4}$ in. in diameter.

c. **P. Menzie′sii Torr.** Stems 6–10 in. high, branching above, gray with a close pubescence and rough with stiff hairs. *Leaves linear, entire or cleft into linear lobes.* Flowers in spikes or spike-like racemes which are clustered to form close panicles. Corolla violet or white, half inch or more in diameter, with long, narrow appendages at base, free from the filaments. Pod shorter than the calyx, with several seeds. From California, in the Sierra Nevada to British Columbia.

The species are numerous, and many are local; nearly all are beautiful, with conspicuous flowers.

V. EMMENAN′THE, Whispering Bells

This chiefly differs from *Phacelia* in the corolla, which is *bell-shaped, withering-persistent, and becoming papery*, yellow or yellowish white, sometimes tinged with pink.

E. penduliflo′ra Benth. Annual, simple up to the inflorescence or branched diffusely from the base, from a few inches to a foot high. The leaves are divided into numerous short, toothed or sharply cut lobes. The racemes are panicled, with the bell-shaped flowers on slender pedicels that are at first erect, but afterwards droop. This grows in dry places from Lake County to San Diego.

VI. ERIODIC′TYON, Yerba Santa

Low-branching erect shrubs. Leaves alternate, dentate, petioled, with the chief nerves pinnate, and the others forming a network. *Flowers in cymes, coiled at the tips, and generally collected in terminal clusters.* Corolla funnel-form, violet, purple, or white, without internal scales. Stamens with filaments adnate to the tube of the corolla. Styles 2, distinct at the base. *Capsule pointed, 2-celled, splitting on the back and at the sides into 4 hard, thick half-valves.*

a. **E. tomento′sum Benth.** The entire plant is white or rusty, with a dense coat of short woolly down. Southern California.
b. **E. glutino′sum Benth.** This is rather smooth and viscid, with a balsamic exudation. Throughout the Coast Mountains.

VII. HESPEROCHI′RON

Dwarf, stemless perennials with entire, spatulate, or oblong leaves. Flowers on naked, slender peduncles, shorter than the leaves, from the leaf axils. Calyx and corolla with the parts 5–7, the former with linear-lanceolate lobes which are sometimes unequal, the latter rotate or campanulate, white or purplish, with hairy base. Stamens inserted at the base of the corolla with hairy filaments. *Ovary cone-shaped, somewhat adnate to the calyx, tapering to the rather stout style which is 2-cleft at apex, with small stigmas. Ovary 1-celled. Seeds many.*

a. **H. Califor′nicus Watson.** Leaves many in a cluster at base. *Corolla oblong-campanulate, with the lobes longer than the tube*, about half an inch long. From California in the Sierra Nevada to Washington; blooming as soon as the snow melts.

b. **H. pu′milus Porter.** Leaves fewer. *Corolla nearly rotate, its lobes longer than the tube which is densely bearded within*, about half an inch across. Same range and time of blooming as the preceding.

BORRAGINA′CEÆ, BORAGE FAMILY

Herbs usually with stems and leaves, rough-hairy. Leaves alternate, entire, without stipules. Flowers in panicles, cymes, or racemes, coiled at the tips, usually on one side of the peduncles. Calyx 5-parted or cleft. Corolla salver-form. Stamens inserted on the tube of the corolla, alternating with its lobes. Ovules 4, solitary, at the base of the simple style, usually all ripening into 4 nutlets. The coiled flower clusters become straight as the flowers open.

I. HELIOTRO′PIUM, Heliotrope

Calyx 5-parted. Corolla funnel-form. Stamens with short filaments or none, and anthers sometimes cohering by their pointed tips. *Style simple or none, with an umbrella-shaped stigma.* Seeds with endosperm.

H. Curassa′vicum L. Smooth, glaucous, succulent, prostrate herbs, growing in moist, salty or alkaline places. Flowers white or pale violet in dense spikes, which are generally 2-forked. Widely distributed.

II. AMSINCK′IA, Fiddle-neck, Woolly Breeches

Hairy annuals, with conspicuous yellow or orange flowers in curved spikes or racemes without bracts. Many are covered with bristly hairs that have a pustulate base. Calyx 5-parted. Corolla funnel-form, with the tube longer than the calyx. Stamens with short filaments included in the corolla. Stigmas 2-lobed, capitate. Nutlets ovate-triangular, attached above the base to a narrow pyramidal column called the gynobase. The species are difficult to distinguish.

III. CYNOGLOS′SUM, Hound's Tongue, Forget-me-not

Calyx 5-parted, open in fruit. *Corolla tubular or salver-form, with conspicuous crests in the throat. Nutlets 4, covered over the back with short, stout prickles with barbed tips, forming burs.* These are rather coarse perennials, with large leaves and thick roots.

C. gran′de Dougl. Stems a foot or two high, branching above. Leaves mostly at the base on long petioles, oblong-ovate. Flowers in panicled racemes on a long naked peduncle. Corolla similar to the forget-me-not, but larger, at first pinkish, with white crests in the throat, turning blue after pollination. Monterey County to Washington.

IV. MERTEN′SIA, Bluebells

Stems erect, leafy, *not hispid, sometimes smooth.* Leaves broad, the upper ones sessile, the lower petioled. Flowers nodding, in cymes or panicled racemes. Corolla blue, often turning pink after pollination, trumpet-shaped or bell-shaped, with folds in the throat. *Nutlets sessile, on a flat or slightly convex receptacle.*

a. **M. oblongifo′lia Don.** Stems about a foot high, almost smooth. Leaves oblong or somewhat spatulate, rather succulent and with veins scarcely evident. *Corolla blue, with tube twice as long as the border, together about half an inch long.* Flowers in a close, terminal cluster. Stamens with the filaments as broad as the anthers and about the same length, inserted in the throat of the corolla. Blooming in early spring, growing on moist banks. Oregon to British Columbia.

b. **M. panicula′ta Don.** Stems 1–5 ft. high, more or less rough with pubescence. Leaves broad, veiny, ovate to oblong-lanceolate. Flowers blue, in loosely panicled racemes. *Corolla tube but little longer than the border, about as long as the hairy, linear, calyx divisions, together a half inch or more in length.* From Washington to the Arctic regions.

(Most of the other genera are in a state of confusion, because of the differences of opinion among botanists. The differences between them lie chiefly in the seeds, and they are difficult to distinguish.)

LABIA′TÆ, MINT FAMILY

Herbs or shrubs with 4-angled stems and opposite leaves. Flowers generally in whorls, or solitary in the axils of the leaves. Calyx ribbed, with many nerves. Corolla 2-lipped. Stamens 4 in two sets, 2 often sterile. Fruit of 4 nutlets around a simple style. These plants are generally aromatic.

I. MEN′THA, Mint

Calyx 5-toothed. Corolla with short tube, naked within, and 4-cleft border, scarcely 2-lipped, but with the upper lobe broadest. *Stamens 4, nearly equal, erect, distant. Flowers small, white or purplish, in whorls.* Aromatic and sweet-scented herbs. (There are several cultivated species.)

a. **M. Canaden′sis L.** Flowers all in axillary whorls, the summit of the stem being flowerless. Calyx hairy. Common in damp places.

b. **M. Pule′gium L.** Covered with a white-woolly pubescence. Calyx slightly 2-lipped, 10-ribbed, the throat closed with hairs. Recently introduced, but spreading rapidly.

II. MONARDEL′LA

Calyx tubular, with 5 short, nearly equal teeth, and the throat naked within. Corolla with the tube longer than the calyx, smooth within ; upper lip 2-cleft, lower one 3-parted, with flat, oblong-linear lobes. *Stamens 4, projecting beyond the corolla. Flowers in terminal heads having conspicuous involucres.*

a. **M. villo′sa Benth.** *Perennial* herbs with many stems from a woody base, soft-hairy. *Leaves ovate, strongly veined.* Bracts of the involucre similar to the leaves. Flowers flesh-color, white, or most frequently purple. Widely distributed, and blooming at all seasons.

b. **M. odoratis′sima Benth.** *Perennial* with several stems from a woody root, 6–12 in. high, pale green or gray with a minute pubescence. Leaves *oblong to lanceolate, entire, on short petioles, with veins inconspicuous.* Bracts thin and membranous, veiny, white or purple. Calyx teeth hairy. Common in the mountains of California and extending to Washington.

c. **M. lanceola'ta Gray.** *Annual*, with stems loosely branching, a foot or more high, green and almost smooth. Leaves oblong or lanceolate, tapering into a slender petiole. *Bracts ovate or ovate-lanceolate, with cross veinlets between the principal veins. Corolla purple;* calyx teeth acute, densely hirsute within, almost smooth without. Throughout California in the valleys and plains.

d. **M. can'dicans Benth.** Annual, gray, with soft pubescence. Leaves lanceolate to narrowly oblong, obtuse, tapering to a petiole. *Bracts ovate, somewhat papery, white with greenish nerves; cross veinlets between the principal nerves. Corolla white, small and short;* calyx teeth short, obtuse, tipped with white wool on both sides. Through middle and southern California.

III. MICROME'RIA, Yerba Buena

Calyx tubular, equally 5-toothed. Corolla short, naked within; *upper lip erect, entire or notched, lower spreading, 3-parted. Stamens 4.* These are sweet-scented plants, with small lavender flowers in the axils of the leaves.

M. Douglas'ii Benth. Perennial herbs, spreading by trailing stems. Leaves round-ovate, sparingly toothed. This usually grows in the shade of bushes and trees in the Coast Mountains.

IV. SPHA'CELE

Calyx bell-shaped, 5-cleft, thin, membranous, enlarged in fruit and persistent. Corolla oblong, bell-shaped, with 5 broad and roundish, erect lobes, and a hairy ring at the base of the tube within. *Stamens 4, distant, one pair shorter.*

S. calyci'na Benth. Shrubby at base, with many leafy stems. Flowers an inch long, solitary in the upper axils, forming a raceme. Corolla white or tinged with purple. The entire plant has a sweet aromatic perfume. From middle California southward.

V. SAL'VIA, Sage

Ours are all herbs. Calyx 2-lipped, with the upper lip 2 or 3 toothed, lower 2-cleft. Corolla deeply 2-lipped, with the upper lip erect, entire, notched, or rarely 2-lobed. *Stamens 2, with filaments apparently forked, one end bearing a linear* *anther cell, the other end a mere rudiment of an anther cell.* The nutlets when wet become mucilaginous and send out spiral threads.

a. **S. cardua′cea Benth.** THISTLE SAGE. *Leaves clustered at the root, white-woolly, thistle-like.* Flowers in whorls. *Corollas large, bright blue.* This is a very showy plant of the interior valleys of California.

b. **S. Columba′riæ Benth.** CHIA. *Leaves wrinkled with numerous veins, once or twice parted into oblong, crenate or toothed divisions.* Flowers in one or more rather distant whorls on the naked stems. *Corolla rather small, dark blue.* Involucre of entire leaves, like bracts. Widely distributed.

VI. AUDIBER′TIA, California Sage, Bee Sage

Shrubby plants with leaves wrinkled and veiny, finely crenate. Flowers similar to those of *Salvia*, except that the *filament has but one linear anther cell, and shows the remains of the connective as a sort of spur.* The various kinds of sage, so well known as honey plants, all belong to this genus. They are most abundant in southern California, where they sometimes clothe the hillsides.

* *Flowers in dense whorls at intervals along the stem. Bracts crowded and conspicuous. Shrubs.*

a. **A. niv′ea Benth.** WHITE SAGE. Stems and leaves covered with a snow-white down. Whorls an inch across, usually 2–4. Corolla lavender or lilac, with the tube scarcely longer than the lips. Stamens and style conspicuously extending beyond the corolla. The bracts and the calyx teeth are blunt.

b. **A. stachyoi′des Benth.** BLACK SAGE. Stems and leaves ashy gray, becoming greener and smoother with age. Clusters of flowers 3–5 at long intervals, on slender stems. Corolla lavender, half an inch long. Calyx teeth and bracts bristle-tipped.

** *Flowers in a close panicle. Floral leaves and bracts of the small and numerous clusters lance-shaped or awl-shaped. Shrubs.*

c. **A. polystach′ya Benth.** WHITE SAGE, GREASE WOOD. Stems many, erect, covered with a fine white down; inflorescence a foot or so in length; flowers nearly sessile. Calyx with the upper lip broad, the lower with 3 long teeth. Corolla half an inch or more long, white or lavender, with a short tube and broad lower lip. Stamens and styles long, conspicuously exserted. This is said to be the best honey sage.

*** *Flowers large, in dense whorls. Woody only at base.*

d. **A. grandiflo′ra Benth.** Stem stout, 2–3 ft. high, woolly and glandular. Leaves wrinkled, white tomentose on the lower surface, sinuate-crenate. The lower ones are broadly lanceolate, with the base somewhat arrow-shaped, 3–8 in. long on margined petioles ; the upper are oblong and sessile. Corolla 1½ in. long, bright red, with tube longer than the limb. Bracts broad and membranaceous. Stamens extending beyond the corolla. This is common from near San Francisco southward. It generally grows in the hills.

VII. SCUTELLA′RIA, Skullcap

Low perennial herbs, with flowers in the axils of the leaves on short peduncles. *Calyx helmet-shaped. Corolla with an arched upper lip and dilated throat. Stamens 4, the lower pair with 1-celled anthers, the upper with 2-celled bearded anthers.*

a. **S. tubero′sa Benth.** *Low from slender underground stems terminating in small tubers.* Leaves ovate, toothed, on slender petioles. *Flowers dark blue*, over half an inch long. From Santa Barbara County northward.

b. **S. Califor′nica Gray.** *Stems several, from slender rootstocks.* Leaves entire, narrowed at base. *Flowers yellowish white*, about two-thirds of an inch long. Northern California to Oregon.

c. **S. angustifo′lia Pursh.** Stems erect, leafy. *Leaves oblong to linear, mostly sessile, entire, except for a few teeth on the lower ones.* Pedicels as long as the calyx. Corolla nearly an inch long with slender tube and dilated throat; lower lip woolly within. Throughout California to British Columbia.

d. **S. galericula′ta L.** Stems slender, 1–3 ft. high, simple or branched above. *Leaves ovate-lanceolate, almost sessile, serrate, except at the top. Corolla dark blue*, less than 1 in. long. Widely distributed. Summer.

VIII. BRUNEL′LA, Self-heal

Perennial herbs with usually simple stems and sessile, 3-flowered flower-clusters in the axils of kidney-shaped bracts, the whole forming a spike or head. Calyx tubular, bell-shaped, somewhat 10-ribbed, upper lip broad, 3-toothed, the teeth short; lower lip with 2 longer teeth. Upper lip of the corolla upright, arched, and entire, the lower spreading, reflexed, fringed, and 3-cleft. *Stamens 4, reaching up under the upper lip, with the tips of the filaments 2-toothed, only one tooth anther-bearing.*

B. vulga′ris L. SELF-HEAL, HEAL-ALL, CARPENTER WEED. Leaves with petioles, ovate-oblong, either entire or toothed, often somewhat hairy; corolla usually dark-blue or purplish, somewhat longer than the brown-purple calyx. This is often abundant in damp places, and is widely distributed.

IX. MARRU′BIUM, Horehound

Perennial herbs with many stems, forming a clump a foot or two high, white-woolly. Calyx *with usually 10 nerves and teeth, the alternate ones spiny-tipped and recurved.* Corolla with upper lip narrow, arched and 2-lobed; lower spreading and 3-cleft. *Stamens 4, having anthers with the 2 cells not distinct.* Flowers in dense whorls, in the axils of the upper leaves. This is a widely spread, introduced plant.

M. vulga′re L. Leaves roundish, wrinkled, crenate. Corolla small and white. The bitter aromatic juice is used as a remedy for colds.

X. STA′CHYS, Hedge Nettle

Perennial herbs with a disagreeable odor, — some species growing near water becoming very tall. Flowers nearly sessile, in scattered whorls, purplish or white. Calyx 5-toothed, 5–10-nerved. *Corolla with tube not dilated at the throat, the upper lip erect, arched, entire or notched, lower spreading, 3-lobed, the middle lobe longest. Stamens 4, with 2-celled anthers.*

a. **S. bulla′ta Benth.** Stems one or several, loosely branching, rough with downward-pointing hairs. Leaves ovate, cordate, crenate, obtuse, with petioles an inch or two long. *Flowers red-purple, in whorls, forming an interrupted spike.* This grows everywhere in California, and blooms almost throughout the year.

b. **S. al′bens Gray.** Stems erect, 1–5 ft. high, clothed throughout with soft white wool. Leaves oblong, cordate at base, crenate, 2–3 in. long; upper sessile; lower with short petioles. *Flowers white on a wand-like spike in dense interrupted close clusters.* Calyx with spine-tipped teeth nearly equaling the tube of the corolla. California in the Sierra Nevada Mountains and hills of southern California.

c. **S. Chamisso′nis Benth.** Stems erect, 2–6 ft. high, with stiff hairs pointing downwards, on the angles. Leaves oblong-ovate, 3–5 in. long, crenate, wrinkled with the veins, whitish, with woolly hairs on the lower surface, stiffer ones on the upper. Spike 6–12 in. long. *Calyx with spine-tipped teeth, densely hairy.* Corolla purplish, $\frac{3}{4}$ in. long, hairy; lower lip half as long. A very showy species along the Californian coast from San Francisco northward.

d. **S. cilia′ta Dougl.** Similar to the above, but with the leaves greener and thinner; corolla smaller, with the tube smooth. Along the coast of Oregon and Washington.

XI. TRICHOSTE′MA, Blue-curls, Camphor Weed

Shrubs or herbs with flowers in dense, usually one-sided axillary cymes, stamens and corolla blue or purple (rarely white). Calyx bell-shaped, almost equally 5-cleft. Corolla with a slender tube, 5-parted, the divisions forming in bud a roundish ball which encloses the coiled stamens. *Stamens spirally coiled in the bud, conspicuously protruding from the open corolla.* In bloom in summer and fall.

a. **T. lanceola′tum Benth.** CAMPHOR WEED. Annual herbs with several branches, erect from the base. *Leaves crowded, sessile, lance-shaped.* Cymes almost sessile, conspicuously one-sided, densely flowered. Corolla and calyx somewhat hairy or woolly. This plant is called camphor weed, because it has a strong odor somewhat like camphor, but very disagreeable, sometimes causing headache. Widely distributed in the interior valleys.

b. **T. lax′um Gray.** Annual, diffusely branched, soft, pubescent. *Leaves few, lanceolate-oblong, narrowed to an obtuse apex, 2–3 in. long, on slender petioles.* Cymes loosely flowered, on peduncles. Common from middle to northern California, growing in dry places.

c. **T. lana′tum Benth.** ROMERO. Shrubby, 3 or 4 ft. high. Leaves numerous, narrowly linear, with margins turned under, smooth and shiny above, white-woolly on the under surface. Flowers in numerous cymes in a close terminal cluster, destitute of bracts. *The whole inflorescence, even to the calyx and corolla, is covered with dense violet wool.* The filaments extend an inch or more beyond the corolla. Southern California, in rocky places. It is very conspicuous and beautiful.

SOLANA′CEÆ, Nightshade Family

Herbs or shrubs with leaves alternate and without stipules. Flowers regular, with the parts in fives, except the single style and 2-celled ovary. Fruit a many-seeded berry or capsule. Seeds with curved embryo and endosperm. This family contains Tobacco, Tomato, Nightshade, Egg-plant, Potato, and Chili-pepper.

I. SOLA′NUM, Nightshade, Potato

Corolla wheel-shaped, 5-parted or cleft. *Stamens with short filaments and distinct anthers,* which often apparently unite around the style. Fruit usually a berry.

a. **S. Douglas′ii Dunal.** Somewhat shrubby, widely branching or even climbing by the rough angles of the branchlets. Leaves ovate, entire, or with large teeth, 1–2 in. long. *Corolla white or bluish, small. Berries black.* Common throughout California, near the coast.

b. **S. ni′grum L.** Common Nightshade. Annual, with stems branching diffusely. *Corolla small, white. Berries black when ripe,* as large as peas, in numerous umbels on axillary peduncles. This is common everywhere in waste ground.

c. **S. umbellif′erum Esch.** Shrubby at base, much branched, with leaves and stems hoary. *Flowers in umbels, the corolla bluish purple, $\frac{3}{4}$ in. in diameter.* The leaves vary extremely. Widely distributed.

d. **S. Xan′ti Gray.** Similar to the above, but either smooth or glandular-hairy; leaves thin. *Corolla generally larger.* This is more common in southern California.

II. DATU′RA, Thorn-apple

Stout, widely branching herbs with rank odor and narcotic-poisonous qualities. Flowers large, on short stems from the axils of the leaves. Calyx tubular, 5-toothed, deciduous, leaving a circular disk under the fruit. *Corolla broadly funnel-form, convolute in the bud.* Pistils with long style and 2-lipped stigma. *Capsule prickly all over.* Seeds large, kidney-shaped.

D. meteloi′des DC. Perennial, spreading, and often tall, hoary. Leaves unequally ovate, wavy on the margin, or entire. Corolla white or pale violet, with the border broadly expanded, the 5 angles terminating in long, slender awns. Pods large on recurved peduncles. Southern California.

III. NICOTIA′NA, Tobacco

Herbs (one a tree) with rank odor and narcotic poisonous properties. Calyx bell-shaped, 5-toothed or lobed, closely surrounding the capsule. *Corolla salver-form or funnel-form, with a very long tube.* Stamens with slender filaments and broad anthers included in the tube of the corolla. Pistil with long, slender style and 2-celled ovary, stigma 2-lobed or cap-like. *Capsule splitting generally at the junction of the valves and on the back, appearing 4-celled.*

a. **N. glau′ca Graham.** TREE TOBACCO. This has been introduced from South America, and is now widely distributed in southern California. It is a shrub or small tree with pale-green foliage. Flowers in loose terminal panicles; corolla 2 in. long, greenish yellow, with a long tube, narrowed at the throat; border erect, 5-crenate.

b. **N. attenua′ta Torr.** Stems simple or branching, very viscid. Leaves oblong-lanceolate, pointed at both ends. Flowers in loose, terminal racemes. Calyx teeth short, triangular, acute. *Corolla white, narrow, salver-form, the tube an inch long and the border ½ in. across.* Pod exceeding the calyx. This is widely distributed and is frequently found along highways.

c. **N. Bigelo′vii Wats.** Similar to the preceding but with sessile leaves. Calyx with unequal lobes, *corolla tubular, funnel-form, with tube an inch or more long and the border an inch across;* pod shorter than the calyx. This is also found along highways.

SCROPHULARIA′CEÆ, FIGWORT FAMILY

Herbs and shrubs with corolla 2-lipped or otherwise more or less irregular (2 lobes belong to the upper lip of the corolla; 3 to the lower). Stamens 2 or 4 (2 long and 2 short), or 5, with one lacking the anther. Pistil with a simple style and 2-celled ovary. Fruit a 2-celled pod, with the seeds on an axillary placenta, splitting from the top.

I. VERON′ICA, Speedwell

Low herbs with opposite leaves, and flowers in axillary racemes or solitary. Calyx and corolla 4-parted, with the lobes more or less unequal. Stamens 2. *Pod inversely heart-shaped.*

a. **V. America′na Schweinitz.** Smooth herbs growing in wet places, with the stems rooting at the joints. Leaves ovate or oblong, on petioles. *Flowers numerous, small, bright blue* with darker stripes. Widely distributed.

b. **V. peregri′na L.** Annual, 3–10 in. high, erect, with few branches. Lower leaves opposite, upper alternate, linear-oblong, obtuse, entire or toothed. Flowers on short pedicels in the leaf axils. *Corolla very small, white.* Capsule many-seeded. Common, apparently an introduced weed.

II. SCROPHULA′RIA, Figwort, Bee-plant

Perennial herbs with opposite leaves, and small flowers in loose cymes arranged in a terminal panicle. Calyx 5-cleft, with broad, rounded lobes. *Corolla with a globular tube and 5 lobes; four are erect and the fifth turned down or spreading. Stamens 4 in 2 pairs,* shorter than the lobes of the corolla and inserted low on the tube. A rudiment of a fifth stamen appears in the form of a scale on the upper side of the throat of the corolla.

S. Califor′nica Cham. CALIFORNIAN BEE-PLANT. Stems 2–5 ft. high, nearly smooth. Leaves oblong-ovate, usually cordate at base, coarsely doubly toothed or incised. *Flowers brownish purple,* less than half an inch long, the rudimentary stamen narrowly wedge-shaped or spatulate. The honey-glands produce a large quantity of honey which can usually be seen within the corolla tube. This is widely distributed and common.

III. COLLIN′SIA

Low annual herbs with opposite leaves, and flowers somewhat resembling pea blossoms. *Corolla 2-lipped, with the lower lip 3-lobed and the middle lobe compressed at the sides, including the style and stamens; tube short, with a protuberance at the base on the upper side, the mouth closed by an* *inward projection of the lower lip like a palate.* Stamens 4; a small gland at the base of the corolla on the upper side answers to the fifth stamen.

a. **C. bi′color Benth.** A foot or so high; leaves more or less toothed, the upper ovate-lanceolate, and sessile by a broad base. *Flowers on short pedicels, in racemes at the summit of the stem;* corolla with the upper lip nearly white, the lower rose-color. Widely distributed in California.

b. **C. Francisca′na Bioletti.** Similar to the last, but the flowers are on longer pedicels, more numerous in the whorls; and the *throat of the corolla is entirely closed by the palate.* This grows around San Francisco and is very common.

c. **C. tincto′ria Hartweg.** Flowers almost sessile. Corolla yellowish or white, marked with purple dots or lines, the upper lip and its lobes very short. *The plant is covered with a yellowish or brownish glandular pubescence that stains the hands.* This is common in the foothills of the Sierras.

d. **C. bartsiæfo′lia Benth.** *Leaves thickish in texture, linear to ovate-oblong, crenate.* Flowers on short pedicels, crowded in the axils of the leaves or bracts. Corolla nearly white, with the throat bearded, and longer than broad, upper lip about the length of the curved throat. This grows in sandy soil in the central and western parts of California.

e. **C. parviflo′ra Dougl.** Stems slender, branching, 2–6 in. high, leaves lanceolate or oblong, narrowed at base and entire, sometimes whorled. Flowers on slender pedicels, solitary or several in a whorl. *Flowers small, less than $\frac{1}{4}$ in. long.* Corolla blue and white, a little longer than the narrow, triangular calyx lobes. Common in the Sierra Nevada range and north to British Columbia. In bloom early.

IV. PENTSTE′MON

Perennial herbs with opposite leaves, the upper sessile or partly clasping. Calyx 5-parted. Corolla red, purple, blue, white (rarely yellow), 2-lipped, with a more or less inflated tube; upper lip 2-lobed, lower 3-cleft or spreading. *Stamens 4, the fifth a conspicuous filament without an anther.* Pod usually pointed, splitting from the top into two parts.

a. **P. cordifo′lius Benth.** Stems very leafy, climbing over bushes by long branches. Leaves cordate, serrate, or toothed. Flowers in a leafy panicle. *Corolla scarlet, with a long narrow tube. Sterile filament bearded.* Common in southern California.

b. **P. heterophyl′lus Lindl.** Stems many from a woody base, pale-green. Leaves lance-shaped or linear. *Corolla rose-purple, an inch long. Anthers shaped like a horseshoe, with the base of each cell remaining closed, and forming a sac, ciliate on the opened edges. Sterile filament smooth.* Throughout California in dry places.

c. **P. centranthifo′lius Benth.** Light bluish green and perfectly smooth. Upper leaves heart-shaped, clasping. *Corolla fully an inch long, bright red, tubular, hardly bilabiate, with the lobes spreading but little. Sterile filament slender and smooth.* Most common in southern California.

d. **P. gla′ber Pursh.** Stems 1–2 ft. high, smooth, glaucous. Upper leaves ovate-lanceolate, clasping the stem. Flowers in a long, close panicle. Sepals ovate, pointed. Corolla violet, with swelling throat, 1–1½ in. long. *Sterile filament with a few hairs at top. Anthers opening from the base of each cell to the apex, smooth or slightly hairy.* Along streams. Summer.

e. **P. confer′tus var. cæruleo-purpureus Gray.** Stems slender, erect, smooth, except for the viscid pubescence about the flowers. Leaves linear to lanceolate. Flowers rather small, in 2–5 whorls, 1 in. or more apart. Sepals with papery, fringed margins and pointed tips. Corolla purplish blue, 2-lipped, the lower lip bearded. *Anthers opening from base to apex, the two valves spreading out flat, after the pollen has been discharged. Sterile filament bearded.* In the mountains. Summer.

V. CASTILLE′JA, Indian Paint-brush

Perennial herbs generally with several stems from woody roots. Leaves sessile. *Flowers in simple spikes, with the bracts large and colored red, white, or yellowish. Calyx colored like the bracts, tubular, more or less cleft either in front or behind or on both sides.* Corolla tubular, with a long-pointed upper lip, lower lip very small, 3-toothed, with 3 folds or small sacs below the short teeth (the tube is usually enclosed in the calyx). *Stamens 4, enclosed in the upper lip.* Style long, with stigma cap-shaped or 2-lobed.

a. **C. affi′nis Hook & Arn.** Stems often tall, branched from the base. Leaves simple, linear-lanceolate, entire. Flowers somewhat distant below but crowded above, curved. Upper leaves, bracts, and calyx more or less colored red. *Corolla yellowish or reddish, an inch or more long, curved, surpassing the red calyx,* the lower lip very short. Middle to southern California.

b. **C. foliolo′sa Hook & Arn.** *Stems generally in a bunch, white-woolly.* Leaves short but numerous, lowest entire, upper floral leaves cleft, with the tips dilated, yellowish or red. This is common only on dry hills of the Coast Mountains.

c. **C. latifo′lia Hook & Arn.** Stems leafy, 1 to several from the root, viscid-pubescent. *Leaves short and broad, the upper ones 3–5-lobed, tinged with red.* Calyx lobes longer than the tube of the corolla. Near the coast, from Monterey County northward.

VI. ORTHOCAR′PUS, Owl's Clover

Low annual herbs, similar to *Castilleia* in having spikes of flowers with the cleft bracts and calyx divisions colored. Calyx short, tubular, 4-cleft. *Corolla tubular, with the upper lip hardly longer than the lower, small in comparison with the lower, which is inflated and in several species has 3 round sacs.*

* *Bracts with tips colored like a corolla.*

a. **O. purpuras′cens Benth.** Escobita. Simple and erect, or branched at the base, hairy. Spike dense, oblong, the lobed bracts and the calyx divisions crimson. *Upper lip of the corolla densely bearded with crimson hairs, hooked at the apex, the lower lip with 3 very small sacs.* Stigma large, globose, densely covered with purple hairs. Very common in spring. Widely distributed.

b. **O. densiflo′rus Benth.** Owl's-clover. This is similar to the above, except that *the upper lip of the corolla is straight and the lobes of the bracts and of the calyx white and crimson;* the leaves are soft, pubescent, with few lobes, or entire at the base. Along the coast.

** *Bracts not colored like a corolla.*

c. **O. erian′thus Benth.** Slender, with many branches; stems and bracts dark red. *Corolla deep yellow, the upper lip slender, pointed, dark-purple, the sacs on the lower lip large, round, and deep, the tube very slender.* Monterey County northward.

d. **O. versi′color Greene.** Pop-corn Flower. Similar to the last, *but the flowers are pure white, fading pinkish.* In one variety the flowers are rose-color from the first. This species is very fragrant. Around San Francisco.

e. **O. lithospermoi′des Benth.** Stems rather stout, generally simple, 1–1½ ft. high, very leafy. Flowers in a dense spike. Calyx lobes linear. *Corolla deep yellow, fading whitish, an inch or more long, with 3 large sacs.* This blooms later than the others. Throughout California.

There are many species besides these.

VII. PEDICULA′RIS

Perennials with one to several stems from a thick root. Leaves pinnately divided or lobed, the divisions often toothed, cleft, or divided. Calyx 2–5-toothed, irregular. *Corolla 2-lipped, the upper arched and compressed on the sides, sometimes with a beak; the lower erect at base, 3-lobed, and with 2 crests above.* Stamens 4, in the long upper lip.

P. densiflo′ra Benth. INDIAN WARRIOR. Leaves twice pinnately divided, with the divisions sharply and irregularly incised. Stem and leaves dark-red when young, becoming greener with age. Flowers an inch long, crimson, in a dense spike that lengthens in fruit. Common in western and middle California.

VIII. MIM′ULUS, Monkey Flower

Herbs, or one species shrubby, with opposite, simple leaves and showy flowers on axillary peduncles. Calyx bell-shaped, 5-toothed, and with as many folds and angles, often oblique. *Corolla with the tube included in the calyx and the border with 5 round, spreading lobes arranged so that 2 form the upper lip and 3 the lower.* Within the tube are two ridges flattened on top, running down the lower side of the throat. Stamens 4, with the anther cells diverging. *Stigma 2-lobed, with spreading parts, often somewhat shield-shaped.* When an insect alights it touches the stigma, which immediately closes, the 2 lips folding together; the anthers are thus exposed, so that the insect becomes dusted with pollen. This can be observed by touching the stigma with a pencil.

a. **M. cardina′lis Dougl.** RED MONKEY FLOWER. Stout, 2–4 ft. high, viscid-pubescent. Leaves sessile, ovate, dentate, 2 in. long. *Corolla scarlet, 2 in. long, with all the lobes except the upper one reflexed.* Stamens projecting from the corolla. This grows along streams. Widely distributed.

b. **M. Lewis´ii Pursh.** Perennial, with erect, rather slender stems, 1–2 ft. high, or more. Leaves lanceolate-ovate, with the margin finely toothed. *Corolla rose-red, 2 in. long, the border of roundish, spreading lobes.* Stamens included within the corolla. This is one of the handsomest species. It grows in shady, moist places from British Columbia through California, in the mountains.

c. **M. brev´ipes Benth.** Annual, 1–2 ft. high, viscid-pubescent. Leaves lanceolate to linear, 1–4 in. long. Calyx teeth unequal, pointed. *Corolla yellow, 1½ in. long, the border campanulate, an inch across, with rounded lobes.* From Monterey southward.

d. **M. Bolan´deri Gray.** *Annual, with stems about a foot high, viscid-pubescent.* Leaves oblong, 1–2 in. long. *Corolla crimson, an inch long, tubular, with the border slightly spreading.* This is common in the foothill region of the Sierra Nevada through California.

e. **M. moscha´tus Dougl.** MUSK-PLANT. Perennial, with low, spreading stems, *soft-hairy, musk-scented. Corolla light yellow,* ½ in. long. This grows in wet place and roots at the joints of the stem. Widely distributed.

f. **M. Langsdor´ffii Don.** Annual or perennial, the former slender, the latter stout, growing in wet places and rooting at the joints of the lower parts of the stem. Stem leaves round, clasping; root leaves on petioles, with a roundish blade at the top and a few small leaflets below. *Corolla yellow, with brown or red spots, decidedly 2-lipped, large, from 1 to 1½ in. long.* Widely distributed and extremely variable.

g. **M. tri´color Lindl. (Euna´nus Benth.).** Low, with spreading, leafy branches. *Corolla 2 in. long, with a short, slender tube and wide border of almost equal lobes, rose-purple, marked with deep crimson, and with yellow throat.* This is a very beautiful plant, and grows in low, damp places. From middle California northward.

h. **M. Douglas´ii Gray (Euna´nus Benth.).** Erect, with stems beginning to flower when an inch or so high. *Corolla crimson, decidedly 2-lipped, the lower lip wanting, or much shorter than the upper lip;* tube from 1 to 1½ in. long; throat funnel-form, dilated. Throughout California, in bloom usually very early.

i. **M. glutino´sus Wendland (Dip´lacus Nutt.).** *Shrubby,* 3–6 ft. high, with glutinous, evergreen foliage. Leaves opposite, serrate, veiny. *Flowers yellow or reddish, large and showy, solitary, on pedicels in the leaf axils.* This is common throughout California, and has many forms regarded as species by good botanists.

j. **M. exi´lis Dur.** Annual, erect, with branched stems about a foot high, leafy and soft-hairy, *somewhat viscid, flowering from the first.* Leaves lanceolate, sessile, entire, the lower longer than the upper and shorter than the pedicels. Calyx 5-cleft, bell-shaped, the tube without angles and almost without nerves. *Corolla a little* *longer than the calyx, yellow, with nearly equal lobes and sometimes some brown spots in the throat.* Common throughout California in the dry beds of streams.

OROBANCHA´CEÆ. Broom Rape Family

Root parasites, tuberous, pale or brownish in color, with scales in place of leaves. Corolla 2-lipped. Stamens 4, in 2 sets. Ovary 1-celled, with parietal placentæ. Seeds many, very small. Style long, with stigma 2-lobed. Pod splitting into 2 valves when ripe, each valve with 1 or 2 placentæ.

APHYL´LON, Cancer Root

Flowers yellowish or purplish, usually on peduncles. Stamens included in the somewhat 2-lipped corolla. Calyx with 5, nearly equal, pointed lobes. Stigma shield-shaped or with 2 broad, flat lobes. Placentæ, a pair to each valve. Anther cells deeply separated from below, awned at the base.

a. **A. uniflo´rum Gray.** Stem very short, bearing one or a few slender scapes a few inches high. *Flowers violet and violet scented, terminating the scapes.* Frequent in California and north to British Columbia.

b. **A. fascicula´tum Gray.** Stems rather slender, nearly as long as the numerous fascicled peduncles. *Flowers brownish or yellowish.* Widely distributed.

PLANTAGINA´CEÆ. Plantain Family

Herbs with the leaves and peduncled spikes all from the root. Corollas papery, 4-cleft.

PLANTA´GO, Plantain

Flowers perfect, each with a bract below. Calyx of 4 persistent sepals free from the ovary. Corolla greenish or dull white. Stamens 2–4, with long filaments. Fruit a capsule opening by a lid which falls off, carrying with it the placenta with the shield-shaped seeds attached.

a. **P. ma′jor L.** Common Plantain. *Leaves large, ovate, 5–7-ribbed, the petioles channeled on the upper side.* A wayside weed, introduced.

b. **P. lanceola′ta L.** Hairy. *Leaves long, lanceolate, 3–7-ribbed. Flowers with conspicuous stamens;* at first in a head, lengthening to a spike. Introduced.

c. **P. marit′ima L.** *Smooth, leaves linear, fleshy.* Spike oblong. This is found along the seashore.

d. **P. Patago′nica Jacq.** *A small annual covered with white silky wool.* Scape 2–3 in. high. Flowers in dense oblong spikes, except in very small plants, where they form a head. Widely distributed. This has been made to include many species which are difficult to distinguish.

RUBIA′CEÆ. Madder Family

Herbs or shrubs with opposite, entire leaves with stipules; or whorled leaves without stipules. Calyx and corolla 4-lobed, adnate to the ovary. Stamens distinct, alternate with the lobes of the corolla and borne on its tube. Ovary 2–5-celled. Seeds with endosperm. The plants yielding coffee and quinine belong to this family.

I. CEPHALAN′THUS, Button Willow

Shrub growing near water, with willow-like leaves, opposite or whorled; and scale like stipules within the petioles. Flowers in a dense, round head. Calyx pointed at base, 4-toothed. Corolla with a long, slender tube and a small, 4-cleft border. Stamens short. Style long, conspicuous, with a cap-like stigma. Capsule, when ripe, splitting from the base upward into 2–4, closed, 1-seeded parts.

C. occidenta′lis L. Leaves lanceolate, 3–5 in. long. Heads an inch in diameter, flowers cream-color. Common along streams throughout California, except near the coast.

II. KELLOG′GIA

Low, slender, much-branched herbs. Leaves opposite, with stipules between the petioles. *Flowers small, dull purple, in loose cymes.* Calyx tube somewhat flattened, covered with stiff, short bristles. Corolla funnel-form with narrow lobes. Stamens 4, on the throat of the corolla. Style slender; stigmas 2, thread-like. Fruit covered with hooked bristles, splitting into 2 parts, to the walls of which the seeds adhere.

K. galioi′des Torr. This grows in damp, shady places in the Sierra Nevada Mountains, chiefly northward.

III. GA′LIUM, Bedstraw, Cleavers

Herbs with slender stems, whorled leaves, and no stipules. Flowers small, white or greenish. Calyx without a border. Corolla wheel-shaped, 4-parted. Stamens short; styles 2, short, with cap-like stigmas. Fruit dry or fleshy, of 2 similar rounded parts with 1 seed in each.

* *Fruit a berry. Perennials.*

a. **G. Califor′nicum Hook. & Arn.** Stems low, generally growing in bunches. *Leaves thin, oval, with a bristle-tipped apex: margin and midrib with stiff hairs.* Fruit pearly white when ripe, turning black when dried, smooth, on recurved pedicels. Common from San Francisco southward.

b. **G. Nuttal′lii Gray.** *Shrubby, climbing over the bushes, with a tangled mass of slender stems* which are minutely spiny on the angles. Common throughout California near the coast.

c. **G. Andrews′ii Gray.** Low, densely matted, nearly smooth, with *leaves bright, shining green, crowded, somewhat spine-tipped. Flowers diœcious,* the sterile in few-flowered cymes, the fertile solitary. The dead stems and leaves are persistent and usually become white.

** *Fruit dry.*

d. **G. Apari′ne L.** Annual, climbing by the reflexed prickles of the stem and leaves. *Fruit on straight pedicels, densely covered with hooked prickles forming a bur.* Common.

e. **G. triflo′rum Michx.** WALDMEISTER. Stems with the odor of vanilla when dry, weak, spreading on the ground. Leaves 6 in a whorl, elliptical, acute at both ends, having a few short, reflexed prickles on the margins and midribs. *Peduncles few, 3-forked;* flowers greenish white, on spreading pedicels. Fruit covered with slender, hooked bristles. This grows in the woods from San Francisco northward.

f. **G. borea′le L.** Erect, smooth, leafy, branched. Leaves in fours, linear to lanceolate, obtuse, 3-nerved. *Flowers white, perfect, in a terminal panicle.* Fruit small, hispid at first, smooth when ripe. In the mountains northward. Summer.

CAPRIFOLIA′CEÆ. Honeysuckle Family

Shrubs or shrubby vines (rarely herbs) with opposite leaves without stipules. Flowers perfect, regular or irregular. Calyx 5-toothed, adnate to the inferior ovary. Corolla 4 or 5 cleft. Stamens distinct, as many as the corolla lobes and alternating with them. Ovary 2–5-celled. Fruit a berry, drupe or capsule.

I. SYMPHORICAR′POS, Snowberry

Low, branching shrubs, with leaves usually entire (sometimes on young shoots lobed at the base). Flowers in axillary or terminal spikes or clusters with 2 bracts under each flower. Calyx 5-toothed, persisting on the fruit. Corolla bell-shaped, 5 or 4 lobed. *Fruit a roundish, white berry containing 2 bony nutlets.* The berries are usually densely clustered at the ends of the branchlets.

a. **S. racemo′sus Michx.** *Erect shrubs, smooth or with the lower face of the leaves pubescent.* Flowers in terminal, short and interrupted spike-like racemes, or some solitary in the upper axils. Corolla very hairy within at the base of the lobes. Style and stamens short. Widely distributed.

b. **S. mol′lis Nutt.** *Low, diffusely spreading, softly and densely pubescent.* Leaves oval, small. Flowers few in terminal clusters or in the upper axils. Corolla short and broad, but little bearded inside. Throughout California.

II. LONIC′ERA, Honeysuckle, Twin-berry

Twining or erect shrubs with entire leaves (sometimes lobed on short shoots), the upper united around the stem in some species. Flowers many in interrupted spikes, or axillary in pairs which are sessile in an involucre. Calyx minutely 5-toothed. *Corolla tubular, funnel-form, or oblong bell-shaped, with the border 5-lobed; or 2-lipped, with 4 lobes forming the* *upper and 1 the lower lip.* Ovary 2 or 3 celled, with numerous ovules in each cell. Style slender, tipped by a cap-like stigma.

a. **L. hispid′ula Dougl.** Twining, with the broad floral leaves uniting around the stem, the others elliptical, all except the lowest with broad stipule-like appendages, all bluish green and pale. *Spikes of 3–6 whorls of pink flowers with the corollas 2-lipped. Fruit a red berry, somewhat viscid.* Along the coast.

b. **L. interrup′ta Benth.** Stoutish, erect and bushy, less disposed to twine, branches covered with shining white bark. Leaves pale-green, nearly round, all without stipules, several of the upper pairs uniting. Spikes of several interrupted whorls. *Flowers yellow, smooth.* Inner Coast Mountains and foothills of the Sierra Nevada.

c. **L. involucra′ta Banks.** *Shrubs with stems erect, never twining, and leaves never united.* Flowers in pairs on an axillary peduncle, each pair contained in a leafy involucre of 2 bracts. Corolla yellowish, funnel-form, swollen at the base. *Berries close together, black when ripe, the involucre becoming dark red, with the lobes reflexed.* Widely distributed.

d. **L. cilio′sa Poir.** *Stems low, or climbing.* Leaves broadly ovate, glaucous beneath, generally smooth except for the ciliate margin; the uppermost one or two pairs united to form a disk. Whorls of flowers 1–3, generally terminal but sometimes from the lower leaf axils. *Corolla smooth, an inch or more long, trumpet-shaped, scarlet without, yellow within; the tube swollen on one side near the base; the border slightly 2-lipped.* From the Sierra Nevada Mountains of middle California to British Columbia.

III. SAMBU′CUS, Elder

Shrubs or small trees with pinnately compound leaves of 5–11 serrate leaflets. Flowers small, white, in compound cymes. Corolla wheel-shaped or urn-shaped, with 5 lobes. Stigmas and cells of the ovary 3–5. Fruit consisting of "berries," which are really drupes.

a. **S. glau′ca Nutt.** Cymes large and flat. Berries dark-blue, with a dense bloom. This blooms in summer and is common in middle and southern California.

b. **S. callicar′pa Greene.** Cymes ovate. Berries red; rarely yellow. This blooms in spring and is found only in ravines or along streams. Northward.

CUCURBITA′CEÆ. Gourd Family

Herbs, with succulent stems, climbing by tendrils. Leaves palmately lobed, without stipules. Flowers monœcious or diœcious. Calyx adnate to the ovary, with 5 lobes or teeth. Corolla with petals more or less united. Ovary 3–5-celled, stigmas 3–5-lobed. Fruit dry or fleshy. This family contains the Squash, Melon, Cucumber, Pumpkin, and Gourd.

ECHINOCYS′TIS (MEGARRHI′ZA, MICRAMPELIS), Big Root, Chilicothe

The California species are rapidly growing vines, springing from enormous fleshy roots. Flowers small, white, monœcious. Sterile flowers in racemes, at the base of which are the solitary fertile flowers (often they are wanting). Corolla wheel-shaped or bell-shaped. Fruit round or oblong, spiny, the cells within with fibrous walls. Seeds round, flattened. Cotyledons thick, not coming above the ground in germination.

a. **E. faba′cea Naudin.** Flowers yellowish white, numerous; *fruit round, densely covered with long, stout spines.* Seeds 4. This is the commonest species.

b. **E. ma′ra Cogn.** Flowers larger and purer white than the above, less numerous; *fruit pointed at both ends, sparingly covered with spines.* This is a more luxuriant plant than the preceding, and is less common, found chiefly around San Francisco.

c. **E. Orego′na Torr.** *Fruit ovate-oblong,* 1–2 inches long, sparingly clothed with soft spines, with 3–4 cells, each 3-seeded. *Fertile flowers with abortive stamens.* This is common in Washington.

d. **E. macrocar′pa Greene.** *Fruit oblong, densely covered with long, rather soft, stout spines. Seeds several, more than 4.* Central and southern California.

VALERIANA′CEÆ. Valerian Family

Herbs with a disagreeable odor, opposite leaves without stipules, and flowers in cymes. Calyx tube adnate to the ovary, teeth none, or becoming feathery. Corolla with a tube and a 2-lipped border. Stamens 1–3 on the corolla. Style and filaments slender. Stigma entire or minutely 3-cleft. Fruit an akene with the seed hanging.

VALERIANEL′LA

Low annuals with stems generally simple, and flowers in cymes forming whorls at intervals along the stem. Corolla rose-color, small, with tube swollen at base, or with a spur and a 2-lipped border. *Calyx without a border.* The species are few but somewhat difficult to distinguish.

VALERIA′NA, Valerian

Perennials, with simple stems. Flowers small, in terminal panicles or cymes. Corolla white or pale pink. *Calyx limb of 5–15 bristle-like lobes, which are curled up when the flower is in bloom, but spread out, becoming feathery in fruit.* Stamens 3.

a. **V. sylvat′ica Richardson.** Stems erect, a foot or two high, from running rootstocks. Root leaves simple, on long, slender petioles, or compound. Stem leaves pinnately divided into 3–11 leaflets, which are entire or sparingly toothed. Cymes closely flowered, more open in fruit. Flowers light-pink or white, $\frac{1}{4}$ in. long. In the mountains, from middle to great elevations. Summer.

CAMPANULA′CEÆ. HAREBELL FAMILY

Herbs with milky juice. Leaves alternate, without stipules. Calyx adnate to the ovary, persistent. Corolla usually blue, withering and persisting. Stamens generally 5, inserted at the base of the corolla and alternate with its lobes, ripening before the pistil. Stigma with 2–5 lobes, which do not expand until some time after the flower opens. Style hairy, so as to collect the pollen. Capsule 2–5-celled, with axillary placenta, opening by holes at the top or on the sides.

I. GITHOP′SIS

Low, simple or branched annuals, with small blue flowers. Calyx with a 10-ribbed tube and 5 long, narrow, leaf-like lobes.

Corolla tubular bell-shaped, 5-lobed. Stamens with short filaments dilated at the base. Pistil with three stigmas and a 3-celled ovary. *Capsule long and narrow, firm in texture and strongly ribbed, crowned by the persistent calyx lobes, opening by a hole at the top left by the falling away of the base of the style.*

G. specularioi′des Nutt. Leaves linear, sessile, coarsely toothed. Corolla deep blue with a white center. Flowers on short peduncles at the ends of the stems and branches. This is widely distributed, but not conspicuous.

II. CAMPAN′ULA, Harebell

Perennial herbs with determinate inflorescence. Calyx lobes narrow. Corolla blue, bell-shaped, 5-lobed. Stamens 5, with the filaments dilated at base. *Capsule short and roundish, 3–5-celled, opening on the sides or near the base by 3–5 small, uplifted valves, leaving round perforations.*

a. **C. prenanthoi′des Durand.** Stems clustered, slender, a foot or two high. Leaves ovate-oblong, coarsely serrate, those on the stem mostly sessile, the lower ones on short petioles. *Pedicels shorter than the flowers.* Calyx lobes much shorter than the corolla. Style conspicuously extending beyond the corolla. This is found in moist, shady places in the foothills of the Sierra Nevada Mountains and in redwood forests along the coast.

b. **C. Scou′leri Hook.** Stems slender, branching, a foot or so high, smooth or slightly pubescent. Leaves ovate, pointed, sharply serrate, tapering to a petiole. *Flowers on long pedicels, somewhat panicled.* Corolla oblong in bud, exceeding the slender calyx lobes, deeply 5-cleft, with ovate-oblong lobes. In shady woods from middle California north to British Columbia.

LOBELIA′CEÆ. Lobelia Family

Low herbs with milky juice. Leaves simple, alternate. Flowers scattered or in racemes. Calyx 5-lobed, adnate to the ovary or only to its lower half. Corolla irregular, apparently 2-lipped, inserted, with the free part of the calyx, on the ovary. Stamens 5, alternate with the lobes of the corolla. Filaments united into a tube at the base and usually even to the top. Style 1, stigma 2-lobed. Ovary 2-celled with an axillary placenta, or 1-celled with parietal placentæ. Capsule many-seeded, the seeds with endosperm.

DOWNIN'GIA, GARDENERS' NAME Clinto'nia

Low and spreading smooth annuals, growing in low, wet places that gradually dry ("hog wallows"). Leaves small, sessile, entire, becoming bracts above. Calyx tube and ovary very long and slender, becoming twisted, the divisions of the calyx linear and leaf-like. Corolla 2-lipped, the smaller lip of 2 narrow, recurved, or spreading divisions; the other broad, 3-lobed, deep blue, with a white or yellow center. Filaments and anthers united into a curved tube. Capsule long and slender, becoming 1-celled, splitting along the sides but closed at the top.

a. **D. el'egans Torr.** Low, with ovate to lanceolate leaves, acute. *The smaller lip of the corolla of 2 lanceolate divisions;* the other 3-lobed, blue with a white center. Northern California to Washington and Idaho.

b. **D. pulchel'la Torr.** Stems 3–6 in. high. Leaves lanceolate, obtuse. The *smaller lip of the corolla with 2 oblong divisions:* the other broad, 3-lobed, azure blue, with a large white or yellow spot in the center. Through middle California to Oregon.

COMPOS'ITÆ. COMPOSITE FAMILY

Flowers in a dense head, on a common receptacle, surrounded by an involucre composed of many bracts (*f.* Fig. 133; *e.* Fig. 110), with usually 5 stamens inserted on the corolla; the anthers united into a tube which surrounds the style (*f.* Fig. 153; *e.* Fig. 131). Calyx with its tube adnate to the ovary, the limb sometimes wanting, when present taking the form of scales, bristles, etc., known as pappus. Corolla either strap-shaped, 2-lipped, or tubular (*f.* Fig. 147; *e.* Fig. 110), in the first case often 5-toothed, in the last usually 5-lobed. Style 2-cleft above. Fruit an akene, often provided with means of transportation (*f.* Fig. 267; *e.* Figs. 174, 178, 179). The largest family of flowering plants and among the most specialized for insect fertilization. The genera here included belong to the three suborders: I, LIGULIFLORÆ, the corollas all strap-shaped and flowers all perfect; II, LABIATIFLORÆ, corollas of all or only the perfect flowers 2-lipped; III, TUBULIFERÆ, corolla of the perfect flowers tubular and 5-lobed. To the latter belong nine tribes, eight of which are represented by the plants included. The figures refer to illustrations in Part I.

KEY TO THE SUBORDERS AND TRIBES OF COMPOSITÆ

SUBORDER I. — LIGULIFLO'RÆ. All flowers ray flowers. Herbs with milky juice.

SUBORDER II. — LABIATIFLO'RÆ. Corollas of all or only the perfect flowers 2-lipped. Receptacle naked; anthers with conspicuous tails; style branches short, smooth, without appendages.

SUBORDER III. — TUBULIFLO'RÆ. Flowers tubular, the outer ones only with rays, or the ray flowers entirely wanting. The accompanying figures are to illustrate the descriptions of the several tribes. They represent the style branches and anthers as seen when magnified.

Tribe 1. EUPATORIA'CEÆ. Heads without rays. Flowers all perfect, never yellow. Anthers without tails. Style branches club-shaped.

Tribe 2. ASTEROI'DEÆ. Heads with or without rays. Anthers without tails. Style branches of disk flowers flat, tipped with an appendage. Leaves all alternate.

Tribe 3. INULOI'DEÆ. Heads usually without ray flowers. Anthers with tails. Style branches of perfect flowers neither truncate nor tipped with an appendage.

Tribe 4. AMBRO'SIÆ. Heads without ray flowers. Anthers distinct, not united. Style abortive, truncate. Corolla of female flowers rudimentary or wanting. Pappus none.

Tribe 5. HELIANTHOI'DEÆ. Anthers without tails. Style branches of perfect flowers truncate or tipped with an appendage. Bracts of the involucre not papery. Pappus never capillary. Receptacle with chaffy scales mixed among the flowers or only near those on the outside.

Tribe 6. HELENIOI'DEÆ. Similar to *Helianthoideæ*, but there are no chaffy scales on the receptacle.

Tribe 7. ANTHEMOI'DEÆ. Similar to *Helianthoideæ*, but the involucre consists of papery bracts in regular rows, the pappus is a short crown or wanting, and the receptacle rarely has chaffy scales mixed with the flowers.

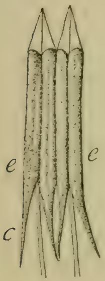

FIG. 5.

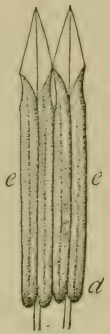

FIG. 6.

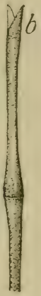

FIG. 7.

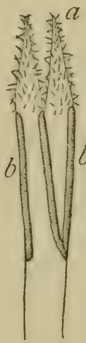

FIG. 8.

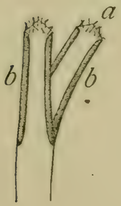

FIG. 9.

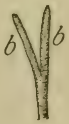

FIG. 10.

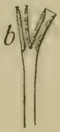

FIG. 11.

Fig. 5. Anthers with tails (*c*, tails). — Fig. 6. Anthers without tails (*d*, base of anthers). — Fig. 7. Style and stigma of *Tribe 9.* — Figs. 8, 9. Flat style branches tipped with an appendage (*a*, appendages). — Fig. 10. Style branches of *Tribe 3.* — Fig. 11. Truncate style branches. — *e*, the part of the anthers containing the pollen; *b*, the stigmatic part of the style.

Tribe 8. SENECIONI'DEÆ. Similar to *Helianthoideæ*, but the pappus is abundant and capillary and the receptacle is destitute of chaffy scales. The bracts of the involucre are generally in a single series.

Tribe 9. CYNAROI′DEÆ. Anthers either with tails or arrow-shaped. Style branches without tips or appendages, often united at the apex. Corollas all tubular, with long, narrow, linear divisions. Receptacle densely bristly.

SUBORDER I. — **LIGULIFLO′RÆ**

All the flowers ray flowers. Herbs with milky juice. The flowers are generally closed in the afternoon.

I. CICHO′RIUM, Chicory

Perennial herbs with long, spreading branches. Leaves radical and alternate, toothed or pinnatifid. *Heads an inch or more in diameter, bright blue, in the axils of the leaves.* Bracts of the involucre in 2 series, firmly enclosing the ripe akenes. *Pappus 1 or 2 series of short, obtuse scales.*

C. In′tybus L. This is very beautiful in the summer and fall. The stems become garlands of bright blue flowers. It has escaped from cultivation.

II. HYPOCHÆ′RIS, Cat's Ear

Annual or perennial herbs, with the leaves all radical, and forming a rosette at the base of the stem. *Stems naked, branching, terminated by heads of yellow flowers.* Bracts of the involucre in rows; receptacle with chaffy scales that fall soon. *Pappus consisting of 1 row of feathery hairs and an outer row of short, stiff bristles.* The two species are introduced.

a. **H. gla′bra L.** Annual. Stems several, slender, erect. Heads rather small, with the involucres as long as the flowers. Widely distributed.

b. **H. radica′ta L.** Perennial. Stems many. Heads much larger, the involucres shorter than the flowers. Not quite so common as the preceding.

III. TRAGOPO′GON, Oyster Plant, Salsafy

Smooth herbs from fleshy tap-roots. Leaves thin, lax, sessile, tapering to a long point. *Heads large, with purple* *flowers,* bracts of the involucre in one series, united at the base and generally longer than the flowers. *Akenes with long beaks and plentiful brownish pappus hairs, that are feathery, with naked tips, and so numerous that they interlace.*

T. porrifo′lius L. This is common, having escaped from cultivation. The large purple heads are on thick, hollow stems. The flowers soon fade.

IV. MICRO′SERIS

Low herbs, with leaves chiefly radical and heads of yellow flowers on naked stems, mostly *nodding before opening.* Akenes ribbed, truncate at apex; *pappus of several papery scales that spread in fruit.* The species are rather difficult to distinguish.

V. STEPHANOME′RIA

Herbs with smooth, almost leafless branches. Heads of *pink flowers,* numerous, sessile, scattered along the naked stems, in bloom only in the morning. *Akenes 5-ribbed, truncate at both ends, with plumose bristles.*

S. virga′ta Benth. This is simple or widely branched, and often grows to a height of several feet. The bracts of the involucre are in a single row, with a few loose ones at base. This is in bloom through the summer and fall. Widely distributed.

VI. RAFINES′QUIA

Annual, smooth herbs, with leafy, branching stems, and heads of *white or flesh-colored flowers* an inch in diameter, terminating the branches. Akenes terete, gradually narrowed to a slender beak. *Pappus white, cobwebby.*

R. Califor′nica Nutt. This is the common species; which is widely distributed but seldom abundant.

VII. MALACO′THRIX

Generally annual, with leafy or scape-like stems. Flowers various. *The akenes have the apex developed into a crown, and the silky pappus bristles falling in a ring.*

. *a.* **M. Coul′teri Gray.** Erect, with glaucous stems and leaves. *The bracts of the involucre are broad, blunt, shining, and papery, with a green midrib, loosely arranged in several rows;* the flowers are white, turning pink in drying or fading. This is one of the most noticeable annuals of the San Joaquin Valley.

b. **M. Califor′nica DC.** *Annual, with the heads large, solitary at the ends of scape-like stems,* the leaves all radical and pinnately parted into narrow, linear divisions. Flowers yellow. The scales of the involucre are linear and loosely ranked. Pappus of 2 persistent bristles and minute-pointed teeth between. This generally grows in sandy soil, and is most common in southern California.

c. **M. saxa′tilis T. & G.** Perennial, with leafy, branching stems, 1–4 ft. high. Leaves entire or cut into slender divisions from lanceolate to thread-like, in some varieties quite fleshy. Heads many-flowered, an inch or less in diameter, terminating the branchlets, white turning to rose-color. Involucres of numerous, narrow bracts extending down onto the peduncle. Akenes ribbed, the summit with a border of minute white teeth. This is common in southern California, blooming in summer and fall, and in several varieties from the seacoast to the higher hills.

VIII. TROX′IMON, Western Dandelion

Perennial herbs, with radical leaves and *heads of yellow flowers on hollow scapes.* Akenes with smooth ribs and a long beak; *the bristles of the capillary pappus falling singly.* The involucre consists of bracts in several series.

IX. TARAX′ACUM, Dandelion

Similar to *Troximon. The akenes have a long beak and the bristles of the pappus persist on the akene.* The only species is not native.

X. SON′CHUS, Sow Thistle

Herbs with spiny leaves, and erect, branching stems. Heads with the bracts in several series, and flowers yellow. *Akenes flat, with soft, silky-white, capillary pappus.*

a. **S. olera′ceus L.** Leaves pinnatifid, tipped with soft spiny teeth, tapering from an auricled base to a long point, the auricles acute, *akenes rough.* This is a very common introduced weed.

b. **S. as′per Vill.** Erect, more robust than the preceding, with leaves decidedly spiny; the auricles of the leaves are rounded. The *akenes are smooth with sharp edges.* This is less common than the preceding.

SUBORDER II. — LABIATIFLO′RAE

Corollas of all or only the perfect flowers 2-lipped. Receptacle naked; anthers with conspicuous tails; style branches short, smooth, without appendages.

PERE′ZIA

Herbs with alternate, rigid leaves. Flowers solitary or in panicles, purple or white, all perfect. Involucre with leathery scales in several ranks. Corolla with slender tube; the outer, longer lip 3-toothed; the inner 2-toothed or 2-cleft. Anthers with long, naked tails at base and a lanceolate appendage at apex. Akenes usually glandular. Pappus of rough, hair-like bristles.

P. microceph′ala Gray. Stems 2–3 ft. high, branching, glandular at the upper part, leafy to the top. Leaves thin, veiny, oblong to ovate, clasping by a heart-shaped base; margin with minute spine-tipped teeth. Heads numerous in corymbs at the ends of the panicled branches. Flowers rose-purple. This is common in southern California, blooming in the summer and fall.

SUBORDER III. — TUBULIFLO′RÆ

Flowers tubular, the outer ones only with rays, or the ray flowers entirely wanting.

Tribe 1. EUPATORIA′CEÆ. Heads without rays. Flowers all perfect, never yellow. Anthers without tails. Style branches club-shaped.

I. BRICKEL′LIA

Herbs or low shrubs, with opposite or alternate, veiny leaves. Heads few- to many-flowered; bracts of the involucre somewhat papery, in regular rows, nerved with parallel rows or veins. Receptacle naked. Corollas slender, 5-toothed at summit, with the teeth glandular on the outside. Pappus a single row of feathery or rough bristles. Flowers white, greenish or pinkish.

B. Califor′nica Gray. Stems 2–3 ft. high, with wand-like branches, usually growing in bunches. Leaves ovate, obtuse, crenate-dentate, about an inch long. Heads in axillary clusters, together forming an interrupted, erect panicle. Common through California, often growing in the gravelly beds of streams. Blooming in the summer and fall.

Tribe 2. ASTEROI′DEÆ. Anthers without tails. Style branches of disk flowers flat, tipped with an appendage. Leaves all alternate.

II. GRINDE′LIA, Gum Plant

Coarse, resinous herbs, with toothed leaves, large heads with yellow rays and disk, in bud covered with a drop of milky-looking resin. Scales of the broad involucre in several series, with green, spreading tips. Akenes compressed. *Pappus of a few bristles that fall off easily.* This is the most recommended cure for the poisoning from Poison Oak. There are several species difficult to determine.

III. LESSIN′GIA

Much-branched, slender-stemmed plants, *with numerous small rayless heads of yellow, purple, or white flowers on slender peduncles, the corollas of the outside flowers having the lobes usually elongated and unequal.* Involucre silky-hairy. *Pappus a single row of stiff rough bristles.* They bloom in the summer, and the flowers deck the stems like small rosettes.

a. **L. Germano′rum Cham.** YELLOW LESSINGIA. Low and spreading, with heads of *yellow flowers.* Outer corollas with lobes unequal.

b. **L. lepto′clada Gray.** Stems from a few inches to 2 ft. high, much branched, *with numerous, very slender, smooth branchlets,* terminated by the *heads of lilac or white flowers.* Lobes of the corolla equal, the tube as long as the pappus. This is widely spread and very variable. The lower leaves are frequently dry when the plant is in bloom. They are spatulate, toothed, white-woolly; the upper are triangular-ovate and closely sessile. Western and central California. Variable.

IV. CHRYSOP′SIS, Golden Aster

Perennial herbs with many stems from the root, very leafy, with alternate, sessile leaves. *Heads either with or without rays*, solitary or in corymbs. Bracts of the involucre in several series, either with or without papery margins, and without green tips. *Flowers yellow.* Akenes compressed, hairy. *Pappus usually double; the inner a row of long, rough, rusty bristles;* the outer a row of short, narrow, chaffy scales or bristles.

a. **C. sessiliflo′ra Nutt.** Hairy or soft-woolly, with stems a foot or so high. Heads about an inch in diameter, with rays. There are several varieties of this which are considered species by some botanists. Common, and in bloom all the year.

b. **C. Orega′na Gray.** Stems spreading, branched above, rough-hairy. Heads numerous without rays, the involucre almost equaling the flowers. The outer pappus consists of slender bristles rather than chaffy scales. This is found in dry stream-beds through middle California to Washington.

V. APLOPAP′PUS

Herbs or shrubs, with numerous heads of yellow flowers, *the outer ones having rays* (with one or two exceptions). *Bracts of the involucre in several series. Akenes narrow, with pappus in one row.* Receptacle honeycombed.

a. **A. linearifo′lius DC.** Shrubby, much branched, forming a bushy plant. *Leaves an inch or less long, sometimes in clusters, viscid, and covered with resinous dots.* Heads solitary at the ends of the numerous branchlets, an inch or more in diameter, with the ray flowers irregularly placed, so that the head has an untidy appearance; the bracts of the involucre are also less regular than in other species. Akenes silvery-hairy, with white pappus that falls readily. On dry hills in the Coast Mountains.

b. **A. ericoi′des Hook. & Arn.** *Shrubby, much branched, with low, spreading branches.* Heads small, numerous, with few yellow flowers and but few rays. *Leaves very numerous, small, terete, closely clustered into small, somewhat fan-shaped bunches, which rather densely clothe*

the stem. This is common on sand-hills along the coast. (There are many other species quite dissimilar in general appearance.)

VI. BIGELO′VIA, Rabbit-brush

Herbs or shrubs with numerous small heads of yellow flowers, *without rays.* Involucres narrow, with bracts arranged one above the other in rows not always distinct, without green tips. Akenes narrow, usually nerved. *Pappus of almost equal bristles. The heads are generally in close compound cymes, terminating the stems.*

B. arbores′cens Gray. Shrubby, several feet high, with many erect branches from a woody stem. Leaves linear, almost thread-like, thickly clothing the stems, covered with resinous dots. On dry hills of the Coast Mountains, rarely in the Sierra Nevada Mountains.

VII. SOLIDA′GO, Golden-rod

Perennial herbs with erect stems and small heads numerous in panicles. Bracts of the narrow involucre not spreading, in several rows, the outer ones regularly diminishing. *Outer flowers with small rays. Pappus in one row, dull white, rough and capillary.*

a. **S. Califor′nica Nutt.** *Stems and leaves hoary and rough to the touch, covered with a fine, close pubescence.* Stems from 1 to 3 ft. tall, terminated by the numerous heads of pale-yellow flowers in a close panicle, sometimes pyramidal and more branched. This grows on dry ground, throughout California.

b. **S. spathula′ta DC.** *Stems and leaves glutinous* (sticking to the paper when pressed), *dark-green.* Stems 1–2 ft. tall, terminated by a spike-like panicle of rather few heads, which are larger than those of the other species. *Lower leaves spatulate,* rounded at the apex and serrate, 2–4 in. long. This grows near the coast.

c. **S. elonga′ta Nutt.** *Stems leafy, with thin, lanceolate, serrate leaves, 2–3 in. long.* Heads small, in more open panicles than the two preceding. Involucre with linear bracts. This is widely distributed, growing along streams and in gulches.

VIII. AS′TER

Perennial herbs with solitary or clustered heads of flowers with rays which are never yellow. The bracts of the involucre are in several rows, and have green and often leafy tips. Akenes compressed, 4 or 5 nerved. Pappus dull white or tawny, of numerous rough, capillary bristles, in a single row. *The disk flowers are yellow, often turning purple, and the rays are white, blue, pink, or purplish.*

a. **A. raduli′nus Gray.** Stem simple below, from a few inches to 1 or 2 ft. high, leafy, *branching above to an open corymb of medium-sized heads.* Leaves diminishing towards the top, stiff and rough, oblong or broadly spatulate, sharply serrate near the top, tapering below. Bracts of the involucre stiff, appressed, with green tips often glandular. *Rays white, the disk corollas becoming reddish.* Pappus rigid. Monterey County to Washington.

b. **A. Chamisso′nis Gray.** Stems 2–5 ft. high, leafy and branching, *terminated by numerous medium-sized heads in long racemes or in widely branching panicles.* Leaves lanceolate, 2–5 in. long, entire or slightly serrate, sessile. Bracts of the involucre in several ranks, with short and rounded tips. Rays white, purple, or violet, 20–25, nearly half an inch long. This is the most widely distributed species. It is somewhat variable in the size and color of the rays and also the inflorescence. Throughout California to Oregon.

IX. ERIG′ERON

This is similar to *Aster*, but *the bracts of the involucre are in a single row, or if there is more than one the ranks are not distinctly apparent.* The pappus is often in two rows, and the rays are generally more numerous and narrower.

a. **E. glau′cus Ker.** Seaside Daisy. Generally, low, perennial herbs, growing in mats near the seacoast. Leaves and stem covered with soft, spreading hairs. Leaves broad, entire; the upper ones sessile, the lowest narrowed to a margined petiole. Heads an inch or two in diameter, with numerous violet or white rays, and the involucres soft-hairy and somewhat viscid. The stems are terminated usually by solitary heads; sometimes there are 3 or 4 in a cluster. This is common on the coast, and in bloom throughout the year.

b. **E. Philadel′phicus L.** Perennial herbs, with stems from 1 to 3 ft. tall, hairy. Root leaves spatulate or obovate, those on the stem oblong, sessile by a broad, clasping base, irregularly toothed. *Heads in a loose corymb, with numerous very narrow pinkish rays.* This is common in wet places.

c. **E. folio′sus Nutt.** Perennials, with several stems from a woody root, simple, very brittle, and leafy up to the corymb, with a rough, grayish pubescence. *Leaves narrow, an inch or two long, entire, diminishing upwards.* Heads with unequal bracts to the involucre and about 30 bluish rays. Inner pappus capillary, outer of a few short bristles. Throughout California. Extremely variable.

d. **E. Canaden′sis L.** Fleabane. Annual with stems from 1 to 6 ft. tall. Heads very small, numerous in a loosely and much-branched panicle. Leaves mostly linear, numerous. *Rays white, inconspicuous.* This grows everywhere and is a common weed.

X. BAC′CHARIS

Diœcious shrubs having numerous heads without rays and with the scales of the involucre in several rows. Pappus capillary in one row, very abundant on the female flowers.

a. **B. pilula′ris DC.** Stems much branched, erect, several feet high, in bunches often forming thickets, or (on the coast hills) low and spreading. *Leaves sessile, wedge-shaped, dark-green, coarsely toothed.* Heads either solitary or two or three in a cluster in the leaf axils, very numerous. Male heads yellowish white, the stamens conspicuous, slightly surpassing the involucre. Female flowers noticeable, because of the long snow-white pappus, which is much longer than the involucre. This is very common along the entire coast in sandy soil. It blooms in autumn and is often covered with small gall-nuts.

b. **B. Douglas′ii DC.** Shrubby at base, glutinous, the herbaceous branches terminated by compound corymbs. *Leaves lance-shaped, acute, 3-nerved.* Scales of the involucre broader in the male heads than in the female, hairy on the margin. Receptacle conical. Flowers whitish. Common from San Francisco southward, along streams.

c. **B. vimin′ea DC.** Flowering Willow. *Shrubby, resembling a willow, with woody branches.* Stems 4–20 ft. tall. Leaves lance-shaped, acute at both ends, entire or with a few teeth. Heads numerous in corymbs terminating the branches. Scales of the involucre very thin, with hairy, papery margins. Receptacle flat. This is found along streams from Monterey southward.

Tribe 3. Inuloi′deæ. Anthers with tails. Style branches of perfect flowers neither truncate nor tipped with an appendage. Ray flowers wanting in the Californian species.

XI. PLU′CHEA, Marsh Fleabane

Annual herbs growing in salt or alkaline marshes, glandular, a foot or two high. *Heads numerous in dense corymbose* *cymes. Bracts of the involucre purplish, thin and dry, in several ranks.* Most of the flowers are fertile, the sterile ones in the center are purplish or sometimes white. Pappus of fine, capillary bristles, in a single row.

P. camphora′ta DC. Leaves oblong-ovate to broadly lance-shaped, nearly sessile, irregularly toothed. The entire plant has a heavy, aromatic odor. In salt or alkaline marshes.

XII. ANAPH′ALIS, Pearly Everlasting

Diœcious, perennial herbs, with white-woolly foliage. *Involucre of many rows of snow-white, papery scales.* Style 2-cleft, only at the apex. Pappus a single series of capillary bristles falling separately.

A. margarita′cea Benth. & Hook. Stems 1–3 ft. high, leafy up to the broad compound corymb. Leaves narrow, lance-shaped, 1-nerved, becoming green and smooth above. Scales of the involucre pearly white, not longer than the flowers. Widely distributed.

XIII. GNAPHA′LIUM, Everlasting, Cotton-batting Plant

Annual or perennial white-woolly herbs, with whitish or yellowish flowers. *Heads with both staminate and pistillate flowers, the latter fewer and in the center. Involucre of several ranks of papery or papery-tipped scales.* Styles in perfect flowers, 2-cleft. Pappus of capillary bristles in a single row.

a. **G. decur′rens Ives.** Stems usually several from the woody root, 1–3 ft. high and rather stout, *glandular under the dense wool. Leaves lance-shaped, with the blade extending down the stem.* Heads many in dense corymbs terminating the stems. Involucre bell-shaped, of many papery scales in several ranks. The plant has a peculiar odor, something like licorice. It is common and widely distributed along the coast.

b. **G. microceph′alum Nutt.** Perennial herbs, with slender, erect stems 2 ft. or more high, loosely branched above, white, with a close wool. Leaves linear, the lowest spatulate. *Involucre small, with bright, white, obtuse bracts. The herbage is odorless, not glandular.*

c. **G. ramosis′simum Nutt.** Perennial herbs with erect stems, 3–6 ft. high, viscid, green, with woolly covering not abundant. Heads in loose panicles, small, *often with pink involucres.* Leaves lance-shaped, with the blade extending down the stem. *The entire plant has a pleasant aromatic odor.* Common on hills near the coast, blooming in summer.

There are several species besides these that are quite common.

Tribe 4. AMBRO'SIÆ. Anthers distinct or slightly united. Style abortive, truncate. Corolla of female flowers rudimentary or none. Staminate heads generally in a cluster above the pistillate ones. Receptacle with chaffy scales.

XIV. FRANSE'RIA

Monœcious. Staminate heads in many-flowered racemes. Scales of the involucre united into a cup; receptacle with thread-like scales among the flowers. *Female flowers usually one or few in the leaf axils, each surrounded with a spiny involucre.* Akenes enclosed in the persistent involucres, which form burs.

a. **F. bipinnatif'ida Less.** Low spreading, perennial herbs, with grayish pubescent stems and leaves. Leaves twice or thrice pinnately divided into roundish divisions. On the coast from Washington to San Diego.

b. **F. Chamisso'nis Less.** Similar to the above, with which it seems to mix. The leaves are ovate or wedge-shaped, with obtuse teeth. These two species grow on the sand dunes of the coast and are frequently associated.

XV. XAN'THIUM, Cocklebur

Monœcious. Male heads many-flowered, with the scales of the involucre distinct in one series; receptacle cylindrical. *Female heads united and enveloping the akene, armed with hooked spines.* These are stout annual herbs, with an abundance of large burs in the fall.

a. **X. struma'rium L.** Leaves broadly ovate, cordate, green on both sides, on long petioles, rough, irregularly toothed. Burs $\frac{3}{4}$ in. long, ovate, *tipped with two stout beaks.* Common, introduced.

b. **X. spino'sum L.** Stems much branched, very spiny, with long triple yellow spines by the sides of the leaves. Leaves lanceolate, white beneath, twice or thrice lobed or cut, tapering into short petioles. Burs flat, less prickly and with weaker prickles than the preceding, and *inconspicuous beaks.* Common, introduced.

Tribe 5. HELIANTHOI′DEÆ. Anthers without tails. Style branches of perfect flowers, truncate or tipped with an appendage. Bracts of the involucre not papery. Pappus never capillary. Receptacle with chaffy scales mixed among the flowers or only near those on the outside.

XVI. WYE′THIA, California Compass Plants

Perennial herbs with simple stems from a stout rootstock. Leaves alternate, large, the same on both sides, erect, the edges pointing north and south. *Heads usually solitary, large, with long broad, yellow rays.* Bracts of the involucre in 2 or 3 rows, the outer leaf-like, the inner thinner and somewhat membranous. Receptacle flat, with the chaffy scales partially folded around the akenes. *Pappus forming a cup on top of the akene, or of from 1 to 4 rigid chaffy awns.* These plants bloom early in the flowering season.

a. **W. helenioi′des Nutt.** *Stems and leaves white-woolly when young.* Leaves all on short petioles, the lowest a foot or two long, 4–8 in. wide. Heads large, 4 in. or more in diameter, leafy at base. Akenes pubescent towards the apex. Pappus scales more or less united into a cup. In bloom early. Around San Francisco Bay on hillsides.

b. **W. gla′bra Gray.** *Similar to the preceding, but the whole plant is smooth and somewhat glutinous, the leaves are leathery and dark-green.* Akenes smooth. In bloom in April and May. In the Coast Mountains, from Marin County southward.

c. **W. angustifo′lia Nutt.** *Radical leaves long-lanceolate, pointed at both ends.* Heads smaller than the two preceding, on long peduncles, leafy only at base. Bracts of the involucre numerous, lanceolate, hairy on the margin, loose and leafy. Pappus of 1–4 stout hirsute awns, with short intervening scales. This is in bloom the latest. It is common and widely distributed.

d. **W. amplexicau′lis Nutt.** *Smooth. Upper leaves sessile.* Involucre broad, bell-shaped, of many loose scales. *Pappus without bristles.* Eastern Oregon to Washington.

XVII. BALSAMORRHI′ZA, Balsam-root

Perennial herbs with thick aromatic roots and large leaves chiefly from the root. *Heads large, usually solitary and* *terminating almost leafless stems, containing many flowers.* Involucre of many loose leaf-like scales in several ranks. Ray and disk flowers fertile, yellow. Pappus none. *Akene of the ray flowers flattened parallel with the scales; those of the disk with 4 angles.*

a. **B. sagitta′ta Nutt.** *Densely covered with white wool.* Leaves entire, *heart-shaped or arrow-shaped*, 4–8 in. long, on long petioles. Scapes a foot or two high. Rays yellow, 1–2 in. long. In the Sierra Nevada Mountains to British Columbia, blooming in early spring.

b. **B. deltoi′dea Nutt.** *Green and almost smooth.* Leaves broadly *heart-shaped to V-shaped*, irregularly serrate or entire, 4–10 in. long. Scapes with small lanceolate or cordate leaves bearing 1–3 heads. Rays an inch or more long. Southern California to British Columbia, blooming in early spring.

XVIII. HELIAN′THUS, Sunflower

Annual or perennial herbs with the lowest leaves opposite, the upper alternate, all simple. Heads large, with conspicuous yellow rays. Bracts of the involucre in several series, green, but not leaf-like. Receptacle flat, with the chaffy scales numerous. Akenes slightly flattened, 4-sided. Pappus of 2 marginal scales that fall soon, and more persistent minute bristles between.

H. Califor′nicus DC. Stems tall, 2–5 ft. high, branching above. Leaves long, lanceolate, or broader at base. Bracts of the involucre narrow, linear-lanceolate, tapering to a long-spreading point. Receptacle convex, with the chaffy scales blunt. Akenes flat, with a smooth pappus of 2 or 3 chaffy scales. This grows along streams. The flowers are quite numerous on the branches at the top of the stem. Common from around San Francisco southward. Summer and fall.

XIX. ENCE′LIA

Perennial, shrubby at base, branching. Leaves opposite or alternate, generally simple. Heads containing many flowers; disk flowers perfect; ray flowers generally present and neutral. Involucre bell-shaped with the scales in several rows one above the other. *Akenes flat, with a thin edge but* *without wings, obovate, 2-toothed at summit or notched, with long hairs or without. Pappus none or a pair of bristles.*

E. Califor′nica Nutt. Gray pubescent at first but becoming smoother and greener. Leaves alternate, ovate to lanceolate, 1–2 in. long. Involucre covered with white hairs. Rays an inch long, yellow.

XX. LEPTOS′YNE

Smooth succulent herbs, with leaves twice or thrice pinnately parted into narrow, linear lobes. *Heads on long peduncles, with a double involucre, the outer of 5–8 narrow, leaf-like scales, the inner of 8–12 thinner and broader erect scales. Rays yellow, conspicuous,* oblong, 3-toothed, 10-nerved. Receptacle nearly flat, with thin papery chaff that falls with the fruit. Corollas of the disk flowers with a slender tube having a ring around the summit below the funnel-form border. *Akenes flat, more or less margined with a wing. Pappus none, or a minute cup.*

a. **L. Douglas′ii DC.** Annual. Stems leafy only at base. Heads on long, naked peduncles. *Rings on the corolla tube hairy.* Common in southern California.

b. **L. Still′mani Gray.** Stems leafy below. Involucre hairy at base. *Ring on the corolla tube smooth.* This is the commonest species.

c. **L. marit′ima** and **L. gigante′a** are shrubby, perennial species with thick fleshy stems. The former grows near San Diego on the coast; and the latter, which has a strong odor of turpentine, near the coast in Ventura and San Luis Obispo Counties, and on the islands off the coast of Santa Barbara.

XXI. BI′DENS, Bur Marigold

Annual herbs, usually growing near water. Leaves opposite. Involucre double, as in *Leptosyne.* Receptacle flat or convex, the thin, narrow, chaffy scales falling with the fruit. *Akenes with a pappus of 2–4 awns, barbed downwards.* The species are somewhat uncertain.

XXII. MA′DIA, Tarweed

Annuals with glandular, aromatic foliage and flowers that wilt during the heat of the day. *Bracts of the involucre in* *one series, boat-shaped, and embracing the black or brown flattened akenes.* Receptacle without chaffy scales in the center, but with one or two rows between the disk and the ray. *Ray flowers and usually disk flowers without pappus.* Rays yellow, sometimes with a brown spot at base.

a. **M. el′egans Don.** Stems branching. Heads in loose panicles an inch in diameter, *with conspicuous yellow rays, often with a brown spot at base.* Foliage lemon-scented. Widely distributed.

b. **M. sati′va Molina.** Stems simple or branching. Heads usually densely clustered, *with inconspicuous yellow rays.* The bracts enclosing the akenes persist around the akenes and adhere to other substances by means of their viscidity, thus accomplishing the distribution of the seed. Widely distributed.

XXIII. HEMIZO′NIA, Tarweed

This is similar to *Madia*, the chief difference being the bracts enclosing the akenes, which in *Madia* almost entirely surround the individual akenes, *while in Hemizonia they only half enclose them.* ("Hemizonia" means half zone.) *The disk flowers generally have pappus and the rays are either yellow or white.* Anthers brown.

a. **H. luzulæfo′lia DC.** Annual, widely branching. *Lower leaves long, linear, silvery, with shining white hairs, the upper leaves very glandular.* Heads numerous, with white or yellow 3-lobed rays less than ½ in. long, the dark-brown anthers conspicuous. This is one of the commonest *Tarweeds*, blooming in summer and fall.

b. **H. pun′gens (Centroma′dia).** Stems much branched, hirsute. Lower leaves twice pinnatifid, with short spiny lobes, those on the *branchlets entire, crowded, spine-tipped. Bracts of the involucre spiny, and also the narrow chaff of the receptacle.* Rays about as long as the disk, 2 or 3 toothed. *Pappus none.* This is common, blooming in summer and fall.

c. **H. multiglandulo′sa Gray (Calycade′nia).** Annuals, with erect stems and branches; covered, especially above, with black tack-shaped glands; lemon-scented. Leaves narrowly linear. Heads crowded in the axils of the upper leaves or sometimes solitary. *Flowers white or tinged with rose-color, the rays 1–7, broad, deeply 3-lobed.* Receptacle flat, with chaffy scales only between the ray and the disk flowers. Common in California. The species are very numerous and difficult.

XXIV. LAY′IA, Tidy-tips (BLEPHARIPAP′PUS)

Annual herbs with alternate leaves. Heads many-flowered, with wedge-shaped, 3-toothed rays. Bracts of the involucre in one series, with papery margins and pointed tips, completely enclosing the ray akenes. *Receptacle flat, with a row of chaffy scales between the ray and the disk, or chaffy throughout.* Ray akenes linear, often purplish, narrowed to the base, flat on top, *without pappus.* They bloom in the spring.

a. **L. glandulo′sa Hook. & Arn.** Loosely branching, about a foot high, hairy, and sprinkled above with stipitate, dark-colored glands. *Pappus of disk flowers, of 10–20 stout bristles, that are densely white-woolly below the middle.* Heads medium-sized, with 8–13, 3-lobed, conspicuous *white or rose-purple rays and yellow disk.* Widely distributed.

b. **L. platyglos′sa Gray.** TIDY-TIPS. Loosely branching or often simple-stemmed, hairy, and glandular. Lower leaves pinnately lobed, with narrow divisions. Heads with large rays, *bright yellow, edged with white. Pappus of 15–25 stout, rough bristles, that are not woolly.* Ray akenes smooth, those of the disk silky-hairy. Throughout California. (There are several other species not so easily distinguished.)

Tribe 6. HELENIOI′DEÆ. Similar to *Helianthoideæ,* but without chaffy scales on the receptacle.

XXV. BAE′RIA, Golden Fields (LASTHENIA)

Low annuals with opposite leaves, entire or irregularly pinnatifid into linear lobes. Heads small, on slender peduncles, terminating the branches or stems. Involucre formed of a single series of flat, oblong scales. Rays entire or 3-toothed, oval or oblong. *Receptacle conical, rough, with projecting points that bear the akenes.* Akenes angled or nerved. Pappus either scales or bristles, or none. These little plants cover the ground for acres, and look like a golden carpet spread over the earth. Some species have a sweet, rather heavy perfume.

B. gra′cilis Gray. SUNSHINE. This is the most widely spread species, but it is not easily distinguished from the others. Fragrant.

XXVI. BLENNOSPER′MA

Annuals, low, slender, much branched, smooth. Leaves pinnately parted into many, narrow, linear divisions. Heads small, terminating the branchlets. Flowers many, light yellow. Involucre with bracts in a single series, generally tipped with dark red. *Receptacle flat. Ray flowers pistillate, without pappus ; disk flowers sterile, except the row next to the ray flowers. Akenes covered with white dots which become jelly-like when wet.*

B. Califor′nicum T. & G. This is the only species. It grows in wet places in early spring and often covers the ground for miles along highways.

XXVII. ERIOPHYL′LUM

Shrubs or herbs with entire or divided leaves clothed with cottony wool, especially on the under surface. *Flowers yellow.* Bracts of the involucre lance-shaped, united at base. *Pappus of membranaceous scales.*

a. **E. stæchadifo′lium Lag.** LIZARD-LEAF. Shrubby, with many stems rising from a woody base, terminated by *loose cymes of rather small heads.* Leaves cut into linear, pinnate divisions somewhat resembling a lizard in outline, green above, white below. Common in the Coast Mountains.

b. **E. confertiflo′rum Gray.** Similar to the above, but smaller, with leaves reduced and scattered, white on both sides. *Heads almost destitute of rays in a dense corymb.* Extending to the Sierras, as well as in the Coast Mountains.

c. **E. cæspito′sum Dougl.** Perennial herbs, with many stems from the root. Heads nearly an inch in diameter, with conspicuous rays, solitary or few, on long peduncles. This is extremely variable and widely distributed.

XXVIII. MONOLO′PIA

Annual herbs with woolly pubescence and sessile leaves alternate above, sometimes opposite below. Heads large, terminating the stems ; *scales of the involucre united into a toothed cup. Receptacle conical, papillose. Pappus none.* Flowers yellow, with conspicuous rays.

M. ma′jor DC. Ray corollas, with a broad 3 or 4 toothed or lobed ray, and bearing on the opposite side of the style a roundish, toothed appendage. Leaves simple, partly clasping. Heads nearly 2 in. in diameter, very showy. Throughout western California, in low ground.

XXIX. CHÆNAC′TIS

Herbs with pinnately compound leaves, more or less white-woolly, and heads of yellow, white, or flesh-colored flowers without rays; *the outer corollas often have an enlarged border simulating a ray.* Involucre with green, linear, erect bracts, generally in a single row. *Receptacle flat. Pappus of chaffy scales.* Akenes slender. The heads are solitary, or in loose clusters on peduncles. The species are not easily distinguished.

XXX. HELE′NIUM, Sneezeweed

Annual or perennial herbs with alternate leaves, and heads on peduncles terminating the branchlets. Bracts of the involucre in 2 series, the external scales narrow, leaf-like, spreading, and at length reflexed, the internal scales few and chaffy. *Receptacle globular. Pappus of 5–12 thin, chaffy scales.* Ray flowers yellow, disk flowers often purplish.

a. **H. puber′ulum DC.** Widely branched, the stems winged with the decurrent leaves. Disk forming a round ball, ray flowers inconspicuous. This is common in wet places.

b. **H. Bolan′deri Gray.** Perennial, with stems a foot or two high. Heads on long, naked peduncles which are thickened at top. Leaves obovate or lanceolate. Heads large, with wedge-shaped rays an inch long; disk an inch across. From northern California to Washington.

c. **H. Bigelo′vii Gray.** Stems tall and simple. Leaves lanceolate to oblong or linear, entire. Heads on long, slender peduncles, with rays half an inch long and disk as broad, somewhat depressed. Common in wet places in the Sierra Nevada Mountains of California.

Tribe 7. ANTHEMOI′DEÆ. Similar to *Helianthoideæ,* but the involucre consists of papery bracts in regular rows, the pappus is a short crown or wanting, and the receptacle rarely has chaffy scales mixed with the flowers.

XXXI. AN′THEMIS, Dog Fennel

Herbs with pinnately dissected leaves and numerous heads, terminating the branchlets. Scales of the involucre in several series, one above the other. Receptacle convex or conical, having chaffy scales among the flowers. Ray flowers white, those of the disk yellow. Pappus none. *Akenes ribbed.*

A. Cot′ula L. WHITEWEED, MAYWEED. This is a common introduced weed, and blooms in summer and fall. It has a strong, acrid taste disagreeable to animals.

XXXII. ACHILLE′A, Yarrow, Milfoil

Perennial herbs, strong-scented, with pinnately dissected leaves. *Stems usually simple, terminated by dense corymbs of small heads of white or pinkish flowers.* Involucres with small scales in several rows. Pappus none, *akenes flattened, margined.* Bracts of the receptacle thin and transparent.

A. millefo′lium L. This is common and widely distributed. The leaves are disposed to form rosettes at the base of the stem, and are delicate and fern-like.

XXXIII. MATRICA′RIA, Chamomile

Erect simple or branching herbs, with pinnately dissected leaves. Heads terminating the branches, on short peduncles. Bracts of the involucre in several series. *Disk greenish yellow, conical. Rays white when present. Pappus in a crown or wanting.*

M. discoi′dea DC. MANZANILLA. Annual, erect, branching. Heads with a high conical disk and no rays. Involucre with white, papery margins to the broadly ovate scales. Akenes with a crown-like margin in place of pappus. This plant has the odor of ripe apples. Widely distributed.

XXXIV. ARTEMIS′IA, Wormwood, Sagebrush

Herbs or shrubs with bitter taste and alternate leaves. *Heads greenish, small, without rays, numerous in racemes or panicles.* Scales of the involucre dry, with papery margins.

Receptacle naked or hairy. *Akenes obovate, with a small disk at top, but without pappus.* These have inconspicuous flowers, often an aromatic odor, and they bloom in the fall.

a. **A. vulga′ris var. Californica Besser.** MUGWORT. Stems simple and tall. *Upper leaves toothed or entire, lower 3–5-parted, green on the upper surface, white-woolly below.* This grows in gulches and along streams, and is widely distributed.

b. **A. Califor′nica Less.** FLEABANE. Shrubby, with many branches from a woody base, 3–4 ft. high, forming a clump. Entire plant white-pubescent. *Leaves pinnately divided into thread-like divisions.* This grows on dry hills and is pleasantly aromatic. Common from San Francisco southward.

XXXV. COT′ULA, Brass-buttons

Small introduced annual herbs, having heads without rays. Bracts of the involucre nearly equal, papery on the margins, in 2 ranks. *Receptacle flat, naked, papillose. Akenes flattened, with spongy margins. Pappus none.* Flowers yellow.

a. **C. coronopifo′lia L.** Smooth, with creeping stems and rather fleshy leaves, which are lanceolate, irregularly pinnatifid, toothed or entire, with broad, clasping base. *Heads ½ in. in diameter, flat on top, the bright-yellow disk flowers very numerous.* This grows in wet places, and is very common near the coast.

b. **C. Austra′lis L.** Smaller than the preceding, hairy. Leaves twice pinnately parted into linear divisions. *Heads very small, with flowers greenish.* This grows along the streets and in waste places.

Tribe 8. SENECIONID′EÆ. Similar to *Helianthoideæ*, but the pappus is abundant and capillary, and the receptacle is without chaffy scales.

XXXVI. AR′NICA

Perennial herbs with creeping rootstocks, and simple stems bearing a few rather large heads of yellow flowers on long peduncles and usually *a few opposite, entire or toothed leaves.* Involucre bell-shaped, of linear or lance-shaped equal scales in one or two series. Rays elongated or sometimes wanting. Pappus a single row of stiff, bearded, capillary bristles. Akenes linear, 5-angled, or ribbed.

a. **A. discoi′dea Benth.** *Heads without rays in a bractless panicle.* Involucre hairy and glandular. Leaves ovate or oblong, irregularly toothed, the upper sessile and often alternate. Akenes becoming smooth, not glandular. In the Coast Mountains.

b. **A. cordifo′lia Hook.** *Heads with conspicuous rays*, usually about ½ in. long (rarely rayless). *Leaves opposite, 2 pairs on the stem;* root leaves roundish and deeply cordate, coarsely toothed. In the Sierra Nevada Mountains.

c. **A. folio′sa Nutt.** Perennial, from rootstocks. Stems erect, leafy, clothed with white wool. *Leaves lanceolate, with small blunt teeth on the margin and with 5 parallel longitudinal nerves.* Heads rather small, in corymbs, on short peduncles. Rays short, yellow. Common in the Sierra Nevada Mountains, north to Oregon, blooming in summer.

XXXVII. SENE′CIO, Groundsel

Herbs or shrubs with *alternate leaves* and heads of yellow flowers either solitary or in corymbs. Bracts of the involucre in a single series, somewhat united, *often with a few loose bracts at the base.* Akenes slender, with fine and soft copious pappus.

a. **S. vulga′ris L.** OLD MAN OF SPRING. Annual, from a few inches to a foot high. Leaves rather thick, pinnately cut into toothed lobes. Scales at the base of the involucre tipped with black. *Heads small, rayless.* This is common in fields and along roads. An introduced weed.

b. **S. Douglas′ii DC.** *Perennial, sometimes shrubby, leafy to the top,* usually white, with cottony wool more or less persisting. *Leaves linear, entire, acute, or pinnately parted into linear lobes.* Heads in corymbs at the ends of the branches, about an inch in diameter. Involucre with a few loose scales at the base. Rays elongated. Widely distributed.

c. **S. aronicoi′des DC.** Stems stout, erect, leafy at base, with *leaves irregularly and coarsely toothed, 3–6 in. long.* Heads rather small, in compound cymes terminating the stems, without rays or with only one or two. Bracts of the involucre without black tips. Common throughout California in low grounds.

d. **S. euryceph′alus Torr. & Gray.** Stems stout, erect, leafy, somewhat white-woolly when young, becoming smoother with age. *Leaves unequally pinnately parted, with wedge-shaped, acutely incised lobes.* Heads many in an ample corymb, with 10–12 long and showy rays.

e. **S. Califor′nicus DC.** Annual, a foot or two high, with smooth, slender stems. *Leaves linear to oblong ; those on the stem clasping at base ;*

those near the base toothed or lobed. Heads in corymbs, with rays half an inch long. Common in southern California, blooming in spring.

f. **S. triangula′ris Hook.** Stems simple, smooth, leafy, 2–5 ft. high. *Leaves triangular, sharply toothed, pointed at top.* Heads many, in corymbs terminating the stem. Involucre bell-shaped, with a few loose, narrow bracts at base. Rays 6–12, half an inch long. In the Sierra Nevada Mountains to Washington. Summer.

Tribe 9. CYNAROI′DEÆ. Anthers either with tails or arrow-shaped. Style branches without tips or appendages, often united near the apex. Corollas all tubular, with long, narrow, linear divisions. Receptacle densely bristly.

XXXVIII. CIR′SIUM (CNI′CUS), (CAR′DUUS) Thistle

Stout herbs, usually biennial, with alternate prickly leaves and large or medium-sized heads of purple, red, white, or yellowish flowers. Scales of the involucre bristle-tipped, arranged in many series, the lower successively shorter. Receptacle flat, densely clothed with bristles. Akenes smooth, obovate or oblong. Pappus of numerous, long, plumose bristles that are deciduous, united in a ring. The style is usually thickened by a knee-like swelling immediately below the stigmatic portion, which consists of two slender divisions united nearly or quite to the top. The species are not easily determined.

XXXIX. SIL′YBUM, Milk Thistle

Stout annuals, nearly smooth, with large root leaves blotched with white, and prickly on the margins. Heads many-flowered and often solitary. Involucre with leaf-like closely appressed bracts, tipped with stout spines. Flowers magenta-purple. Pappus of stiff, chaffy bristles in several rows, not spiny.

S. Maria′num Gærtn. This has been introduced from the Mediterranean region, and is spreading more and more.

XL. CENTAURE′A, Star Thistle

Herbs with small heads of yellow, rose-color, or blue flowers. Involucre globular, the scales spine-tipped or papery at the apex, generally contracted under the flowers. Receptacle very bristly. Akenes compressed, with pappus of numerous chaffy bristles that fall separately. The outer flowers are often funnel-shaped, with broad conspicuous divisions simulating a ray flower. All the species are introduced weeds from Europe.

a. **C. Meliten´sis L.** TOCALOTE. Annual, with spreading branches. Radical leaves pinnatifid, with rather broad lobes, the stem leaves barely toothed, decurrent. *Corollas yellow, inconspicuous.* Scales of the involucre spine-tipped, and with a few prickles at the base. Common in fields and waste places.

b. **C. solstitia´lis L.** Annual, much branched. Stem leaves linear. *Flowers conspicuous yellow.* Outer bracts of the involucre with 3–5 small prickles, palmately spreading ; middle bracts with a stout spine besides. This is less common than the preceding.

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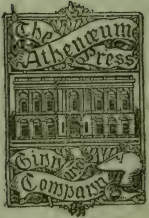

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